



United States  
Department of  
Agriculture



Natural  
Resources  
Conservation  
Service



In cooperation with United  
States Department of the  
Interior, Bureau of Land  
Management, and the  
Montana Agricultural  
Experiment Station

# MT627—Soil Survey of Jefferson County Area and Part of Silver Bow County, Montana

## Part I

The original maps and tables have been deleted from this online version. Since the soil survey's publication, more data on soil properties may have been collected, new interpretations developed, or existing interpretive criteria modified. Maps and current data tables can be accessed through the Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/app/>).



# How to Use This Soil Survey

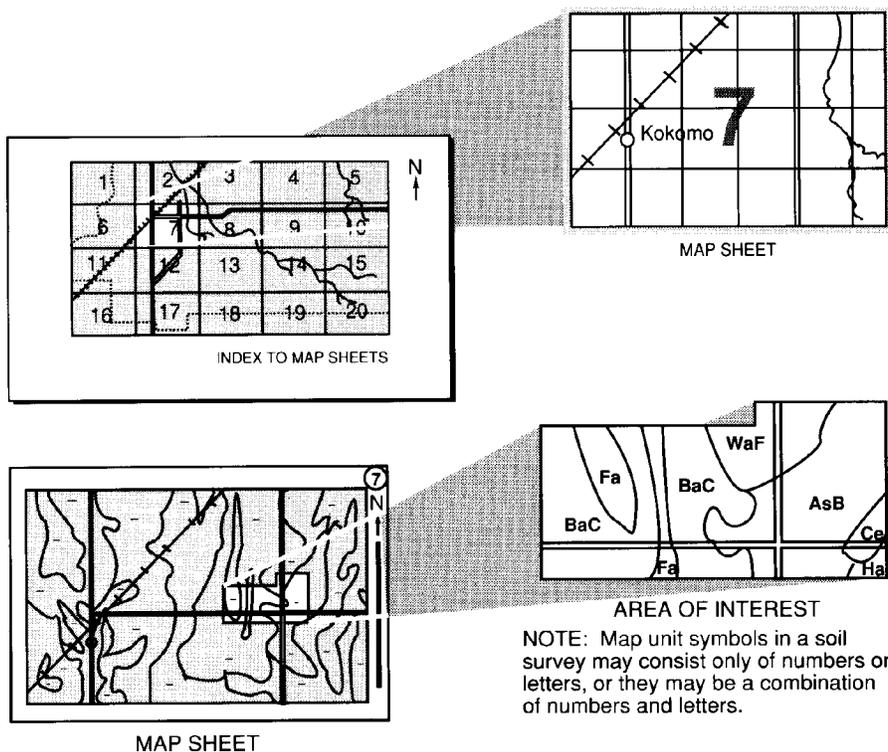
## Detailed Soil Maps

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

To find information about your area of interest, you can locate the Section, Township, and Range by zooming in on the **Index to Map Sheets**, or you can go to the Web Soil Survey at (<http://websoilsurvey.nrcs.usda.gov/app/>).

Note the map unit symbols that are in that area. The **Contents** lists the map units by symbol and name and shows the page where each map unit is described.

See the Contents for sections of this publication that may address your specific needs.



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

Major fieldwork for this soil survey was completed in 1996. Soil names and descriptions were approved in 1998. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1998. This survey was made cooperatively by the Natural Resources Conservation Service; the United States Department of the Interior, Bureau of Land Management; and the Montana Agricultural Experiment Station. It is part of the technical assistance furnished to the Jefferson Valley Conservation District and the Mile High Conservation District.

The most current official data are available through the NRCS Soil Data Mart website at <http://soildatamart.nrcs.usda.gov>. Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

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**Cover: A view of the Boulder River valley. Wetsand soils are in the foreground, and Bull Mountain is in the background.**

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

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# Foreword

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This soil survey contains information that affects land use planning in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights certain soil limitations.

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

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

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

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

Dave White  
State Conservationist  
Natural Resources Conservation Service



# Soil Survey of Jefferson County Area and Part of Silver Bow County, Montana

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Fieldwork by Edward Brinken, Kenneth Drechsel, Thomas J. Keck, Byron Koepke, Patrick E. McCain, and Donald E. Strom, Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with  
United States Department of the Interior, Bureau of Land Management, and the Montana Agricultural Experiment Station

## How This Survey Was Made

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

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

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.

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.

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

## General Nature of the Survey Area

The survey area is in southwestern Montana (fig. 1). It consists of all land in Jefferson County, except for Federal land within the Deer Lodge and Helena National Forests, and approximately 11,200 acres of Silver Bow County. The survey area makes up 603,500 acres, or about 941 square miles. Whitehall is the county seat of Jefferson County.



Figure 1.—Location of the survey area in Montana.

## Physiography, Drainage, and Geology

Jennifer Kouba, student trainee—geologist, Natural Resources Conservation Service, prepared this section.

### Physiography

The survey area lies within the Northern Rocky Mountain Province and the Rocky Mountain Fold-Thrust Belt. It includes slightly more than half of Jefferson County and a small portion of southeastern Silver Bow County.

The Continental Divide, which forms much of the western border of Jefferson County, crosses through the Boulder Range. The Boulder Mountains are mainly in areas of national forest and are not included in the survey area. The same is true of the Elkhorn Mountains, which are in northeastern Jefferson County, and most of the smaller Dry Mountain Range in southwestern Jefferson County. The Bull Mountain Range in south-central Jefferson County, Toll Mountain in the southwestern part of the county, and Doherty Mountain in the southeastern part are included in the survey area.

In general, the mountains of Jefferson County are not very steep or rugged and the intermountain valleys tend to be broad. Relatively narrow canyons are along the upper Boulder River and some minor creeks. The Jefferson River Canyon is also relatively narrow.

Elevation in the survey area ranges from 3,940 feet (1,200 meters) at the point where Prickly Pear Creek leaves Jefferson County to 8,609 feet (2,624 meters) at the peak of Bull Mountain. The highest point in Jefferson County, 9,416 feet (2,870 meters), is Crow Peak in the Elkhorn Mountains.

## Drainage

The Jefferson River forms most of the southern border of Jefferson County and provides drainage for most of the county. The main tributary of the Jefferson River in Jefferson County is the Boulder River. This river and its tributaries drain about half of the county. Other tributaries of the Jefferson River include Whitetail and Pipestone Creeks in southwestern Jefferson County and Fish Creek and Lower Cherry Creek in Silver Bow County. A few miles to the east of the survey area, the Jefferson River joins the Madison and Gallatin Rivers to form the Missouri Headwaters at Three Forks.

The northeastern part of the county is drained primarily by Prickly Pear Creek, which flows into the Missouri River several miles north of the Jefferson County border. A few smaller creeks drain the eastern Elkhorn Mountains and flow into the Missouri River east of Jefferson County.

The Continental Divide lies between the Missouri and Snake River systems.

## Geologic History

During the early geologic history of the survey area, sedimentary rocks were deposited in marine and brackish water environments. Periods of deposition alternated with periods of erosion as sea levels changed. Shale was deposited in low-energy, deep-water environments; limestone formed in warm, shallow water; and sandstone was deposited in beach and near-shore environments. These sedimentary rocks occur as outcrops in southeastern Jefferson County along the Jefferson River and northeast of Whitehall, south of the Elkhorn Mountains along the eastern border, and near Prickly Pear Creek along the northern border.

The alternating deposition and erosion of sedimentary rocks began approximately 1.5 billion years ago and was the primary geologic event affecting this region until about 90 million years ago, when the ancestral Rocky Mountains began to form. Magmatic intrusion and compressive folding and faulting, initiated by tectonic plate subduction along the west coast, continued until about 70 million years ago.

A long period of erosion followed the formation of the ancestral Rocky Mountains. The second period of tectonism in the Rocky Mountains began approximately 50 million years ago, when the mountains were uplifted by block faulting and volcanic activity resumed. Several rivers, including the Jefferson River, are believed to have flowed south

prior to this period of uplift. Uplift of the mountains disrupted the courses of the rivers, causing the formation of closed lake basins in which large amounts of sediment were subsequently deposited. Eventually lake levels rose enough for outlet streams to develop. Jefferson Canyon was probably eroded by the outlet stream of such a lake.

Alpine glaciation further shaped the Elkhorn Mountains, the northern Boulder Mountains, and Bull Mountain. Seismic activity and erosion continue to affect the survey area.

## Geologic Units

Surficial geologic units in the survey area range in age from Precambrian to Recent. The most prevalent rock units are the Boulder batholith, the Elkhorn Mountain volcanics, and the Tertiary sediments.

The geologic units are described, from oldest to youngest, in the following paragraphs. Rock units are classified as formations based on lithology and stratigraphic position, which may be subdivided into members or combined in groups or supergroups. Where outcrops are small and formations are difficult to differentiate in the field, rocks are mapped only on the basis of age.

*Precambrian Era* (4,500 to 570 million years ago).—Formations of the lower Belt supergroup were deposited in a shallow sea that covered much of western Montana.

The pebble, cobble, and boulder conglomerates of the LaHood Formation are the most striking of the Belt outcrops. The depositional environment of this formation is believed to be a submarine fan complex. The boulders of schist, gneiss, and marble were derived from pre-Belt rocks in a highland area. Fine grained marine deposits are also present in the formation. The LaHood type section can be observed in Jefferson Canyon near LaHood Park.

Other Belt formations exposed in the survey area include the Greyson, Spokane, and Empire Formations, which are composed primarily of marine shale.

*Paleozoic Era* (570 to 240 million years ago).—Sedimentary rocks deposited during the Cambrian (570 to 500 million years ago), Devonian (410 to 360 million years ago), Mississippian (360 to 330 million years ago), Pennsylvanian (330 to 290 million years ago), and Permian (290 to 240 million years ago) Periods outcrop in the survey area but are not differentiated into formations. Rock types within these units include limestone, dolomite, shale, sandstone, quartzite, chert, and rock phosphate. The white cliffs

of Doherty Mountain in southeastern Jefferson County are composed of Cambrian limestone.

The Mississippian rocks, which are primarily limestone, have the largest outcrop area of the Paleozoic units. Limestone is resistant to erosion in dry climates and commonly forms cliffs or steep side slopes. These outcrops are visible east of the Boulder River valley and at Lewis and Clark Caverns State Park.

As seas repeatedly withdrew from and returned to the area, the sediments making up the Paleozoic units were deposited. Western Montana was a land area undergoing erosion during most of the Ordovician and Silurian Periods (500 to 410 million years ago); therefore, there are no geologic units of the Paleozoic age in the survey area.

*Mesozoic Era* (240 to 66 million years ago).— During the Triassic Period (240 to 205 million years ago), most of Montana was an elevated land surface undergoing erosion. No rocks were deposited in the survey area during this time.

During the Jurassic Period (205 to 138 million years ago), sedimentary rocks were deposited in a sea that covered most of Montana and, later, on the coastal plain that formed as the sea withdrew. These rocks are not differentiated into formations. Rock types include sandstone, shale, and metamorphosed limestone.

The Kootenai Formation, consisting mainly of shale and sandstone, has small outcrops in the southeastern and northern parts of the survey area. The sandstone is a land-laid deposit, and the shale was deposited in a large freshwater lake. The Colorado Group, which is primarily shale deposited in marine areas, outcrops only in the southeastern part of the survey area. These formations were deposited early in the Cretaceous Period (138 to 66 million years ago).

The Elkhorn Mountain volcanics are exposed on Bull Mountain, the hills in southeastern Jefferson County, the Elkhorn Mountains, and the western Boulder Mountains. The rocks are most commonly fine grained, gray to greenish andesites that frequently weather to form talus slopes. The Elkhorn Mountain volcanics have the same chemical composition as the intrusive granitic rocks of the Boulder batholith and are believed to have the same magmatic source (Alt and Hyndman, 1991). The magma that formed the batholith probably contained very little steam, and thus some of it was allowed to rise to the surface while molten. This magma then erupted at the surface to form the extrusive Elkhorn Mountain volcanics that cover the batholith and neighboring sedimentary units.

The Boulder batholith, a large intrusive igneous

body, is exposed in most of western and northern Jefferson County and in most of the part of Silver Bow County that is included in the survey area. The rocks of the Boulder batholith are mainly light gray, coarse grained granitic rocks classified as quartz monzonite. These rocks crystallized at relatively shallow depths beneath the Elkhorn Mountain volcanics and were later exposed at the surface when erosion removed the overlying volcanics. The estimated age of the Boulder batholith and Elkhorn Mountain volcanics is between 70 and 80 million years.

Other small igneous rock units of Cretaceous age also occur in the survey area. Diorite sills that intruded into older shale formations are mapped in the foothills south of the Elkhorn Mountains. The Easter Lily and Ringing Rocks granitic stocks outcrop on the south side of Dry Mountain. Both are composed largely of quartz monzonite, but the Ringing Rocks stock also contains mafic monzonite along its southern and western margins. The namesake of the stock is located on the south side, where the mafic monzonite has weathered into a large pile of rust-colored boulders that ring when struck with a hammer.

*Cenozoic Era* (66 million years ago to present).— Early in the Tertiary Period (66 to 1.5 million years ago), a long period of erosion removed much of the Elkhorn Mountain volcanics. The Lowland Creek volcanics, composed primarily of quartz latite, were erupted during the Oligocene Epoch (38 to 24 million years ago). Rhyolitic volcanics were erupted after the Lowland Creek volcanics. Both units are exposed within the survey area, in north-central Jefferson County. Larger exposures are outside the survey area, in the Boulder Mountains west of the town of Basin.

Tertiary basin-fill sediments, eroded from adjacent mountains, cover a large portion of southern Jefferson County, including most of the Little Whitetail, Boulder, and Jefferson River valleys. The sediments are known as the Bozeman Group and are divided into two formations. The Renova Formation, the lower unit of the Bozeman Group, consists primarily of alternating beds of limestone, mudstone, siltstone, and fine sandstone deposited during the Oligocene Epoch. The formation has a maximum thickness of approximately 3,500 feet (1,070 meters) in the Jefferson River valley.

Deposition of the Renova Formation was followed by a period of erosion, which continued into the Miocene Epoch (24 to 5 million years ago). The climate was dry during the deposition of the Renova Formation but was tropical during the subsequent erosional period. A red paleosol (buried soil) that rests on top of the Renova Formation is evidence of this climatic change.

The climate became arid in the late Miocene and Pliocene (5 to 1.6 million years ago) Epochs, and the Sixmile Creek Formation was deposited. This formation is the upper unit of the Bozeman Group. It consists mainly of medium or coarse grained sand, fine or medium grained sandstone, sandy siltstone, and marl. Deposition of the Sixmile Creek Formation was also followed by a period of erosion. The formation has a maximum thickness of about 2,500 feet (760 meters) in the Jefferson River valley.

Glacial deposits include till and outwash typically composed of coarse boulders derived from intrusive and volcanic rocks. The deposits are associated with episodes of alpine glaciation that occurred in the Elkhorn Mountains, the northern Boulder Mountains, and on Bull Mountain during the Pleistocene Epoch (1.6 to 0.01 million years ago).

Recent deposits (less than 10,000 years old) include travertine, associated with hot springs, and alluvium along Little Whitetail Creek, the Boulder River, and the Jefferson River. The alluvium of the Boulder River is as much as 100 feet (30 meters) in thickness.

## Soil Parent Materials

### Caves

Carbonate rocks, particularly limestone, are dissolved by ground water to form most caves at or beneath the water table. Speleothems, which include stalactites, stalagmites, flowstone, and globulites (cave popcorn), are formed after the water table has fallen and the cave has become filled with air. As ground water from the unsaturated zone drips, flows, or seeps from cave walls, dissolved minerals (most commonly calcite) precipitate and are deposited to form the speleothems. The growth rate of stalactites has been estimated to be 1 to 4 millimeters per year.

There are six known caves in the survey area (Campbell, 1978). Lewis and Clark Caverns is the most extensive and is the only cave in Montana with regularly scheduled guided tours. The cavern has a total passage length of 4,832 feet (1,473 meters) and contains abundant, well developed speleothems. The other caves range in total passage length from 50 to 370 feet (15 to 113 meters).

Lewis and Clark Caverns formed in the Mission Canyon Formation of the Mississippian-age Madison Group. The steep passages formed along bedding planes that are dipping steeply in this area. The relatively horizontal passages correspond with joint

planes that crossed the bedding. Four different cave levels have been recognized, each associated with the declining water table that accompanied the lowering stream level during the downcutting of Jefferson Canyon.

The Madison Group also houses three of the other caves, none of which contains any speleothems. A Recent travertine deposit has a one-room cave that once contained pictographs and other artifacts. The Cambrian-age Meagher Limestone houses one known cave that contains speleothems.

## Mineral and Ground-Water Resources

The primary minerals that have been produced in the survey area are gold, silver, copper, lead, and zinc. Several other minerals have been produced in small quantities. Mineralization is most commonly associated with the Boulder batholith and other igneous intrusions.

Numerous placer and lode mines have operated in the survey area since the mid-1800's. As of 1958, the total production had been estimated at \$100,000,000 (Roby and others, 1960). Prickly Pear Creek was the most productive placer deposit in the survey area.

Currently, two open pit mines are operating in the survey area. The Golden Sunlight Mine, on the southeast flank of Bull Mountain, produces gold and silver from a Cretaceous breccia pipe. The Montana Tunnels Mine, in the Wickes mining district, produces lead, zinc, gold, and silver from a Tertiary breccia pipe.

Nonmetallic mineral deposits in the survey area include calcite, gypsum, silica, garnet, amethyst, and sapphire. Limestone was quarried for use in smelters at Butte up until 1925. Building stone, including the granite used in the wings of the State Capitol, has been quarried in the survey area. Also, potters in Basin and Cardwell obtain clay from local sources.

The geologic units most commonly used as aquifers in the survey area are Recent alluvium, Tertiary sediments, and fractured zones in the Boulder batholith. As of July 1993, 2,022 water wells in the survey area were registered with the Montana Bureau of Mines and Geology. The majority of these wells yield less than 50 gallons per minute (189 liters per minute). Only 39 of the wells yield more than 50 gallons per minute. Of these, 22 yield more than 500 gallons per minute (1,890 liters per minute) and 8 yield more than 1,000 gallons per minute (3,785 liters per minute). The purpose for which each well was used

(as of July 1993) is tabulated below. Since many of the wells have multiple uses (typically domestic and stockwater uses), the sum of the tabulated uses exceeds the total number of wells.

Total wells .....	2,115
Domestic .....	1,564
Stockwater .....	279
Irrigation .....	88
Public water supply .....	50
Monitoring .....	34
Industrial .....	31
Unused .....	21
Commercial .....	20
Other .....	10
Recreation .....	9
Institutional/schools .....	5
Not reported .....	4

**Geothermal Resources**

Known geothermal resources in the survey area include the Boulder, Alhambra, Pipestone, and Renova Hot Springs. Boulder Hot Springs, with an average spring temperature of 76 degrees C and a yield of 1,900 liters per minute, is one of the best geothermal resources in Montana.

**Seismicity**

The survey area is located within the northern Intermountain Seismic Belt. Shallow earthquakes and earthquake swarms typify this region. Seismic data

collected by the Earthquake Studies Office of the Montana Bureau of Mines and Geology lists 836 earthquakes recorded in the survey area between 1982 and 1992; however, only 19 of the earthquakes had a magnitude of more than 2.5 on the Richter scale. Thirteen of these earthquakes were centered in the vicinity of Boulder. The earthquakes of largest magnitude during this period occurred in July and October of 1986 and were 3.5 on the Richter scale. Both earthquakes were centered near Boulder.

Earthquakes with a magnitude of 2.0 or less are known as microearthquakes. They are commonly felt and recorded only on local seismographs. It is unusual for earthquakes with a magnitude of less than 4.5 to cause any significant damage.

**Climate**

The tables at the end of this section show climate data for the survey area as recorded during various periods at several reporting stations. The tables show data on temperature and precipitation, probable dates of the first freeze in fall and the last freeze in spring, and length of the growing season.

Growing degree days are shown in the temperature and precipitation table. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Temperature and Precipitation

(Recorded in the period 1961-1994 at Boulder, 1961-1967 at Whitehall, 1968-1977 at Whitehall Aviation, and 1978-1990 at Cardwell)

Month	Temperature						Precipitation					
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have--		Average number of growing degree days*	Average	2 years in 10 will have--		Average number of days with 0.10 inch or more	Average snowfall	
				Maximum temperature higher than--	Minimum temperature lower than--			Less than--	More than--			
	°F	°F	°F	°F	°F	Units	In	In	In		In	
<b>BOULDER:</b>												
January----	33.7	9.3	21.5	55	-29	3	0.55	0.19	0.85	1	8.0	
February---	39.3	14.5	26.9	60	-24	8	.33	.11	.51	1	3.3	
March-----	45.5	19.8	32.6	66	-13	29	.58	.34	.79	2	5.0	
April-----	55.1	27.1	41.1	78	6	116	.82	.40	1.18	2	4.2	
May-----	64.7	35.3	50.0	85	20	315	1.88	1.00	2.66	5	.4	
June-----	73.6	42.9	58.2	91	28	545	2.04	1.02	2.93	6	.0	
July-----	82.2	47.7	65.0	95	34	771	1.46	.64	2.17	4	.0	
August-----	81.8	46.1	63.9	95	30	735	1.33	.54	2.01	3	.0	
September--	70.6	36.6	53.6	89	17	414	1.13	.42	1.73	3	.0	
October----	59.7	27.9	43.8	80	4	183	.59	.16	.93	1	.3	
November---	42.4	18.2	30.3	64	-15	22	.54	.22	.80	1	4.8	
December---	34.5	10.7	22.6	55	-28	4	.49	.20	.73	1	6.1	
<b>Yearly:</b>												
Average---	56.9	28.0	42.5	---	---	---	---	---	---	---	---	
Extreme---	100	-42	---	96	-34	---	---	---	---	---	---	
Total-----	---	---	---	---	---	3,144	11.74	9.14	13.79	30	32.2	
<b>WHITEHALL:</b>												
January----	36.9	15.3	26.1	55	-21	8	0.29	0.23	0.45	1	3.0	
February---	44.2	21.5	32.8	63	-10	28	.21	.06	.33	0	1.6	
March-----	47.4	20.2	33.8	72	-9	53	.54	.30	.75	1	6.2	
April-----	57.6	29.2	43.4	80	12	169	.79	.29	1.20	2	4.2	
May-----	68.6	37.6	53.1	88	21	410	1.58	1.32	1.84	5	1.1	
June-----	75.2	45.1	60.2	92	30	616	2.47	1.34	3.47	8	.0	
July-----	85.8	48.4	67.1	96	38	819	.96	.41	1.43	3	.0	
August-----	83.6	46.4	65.0	97	33	768	1.07	.24	1.73	2	.0	
September--	71.6	39.1	55.4	91	20	439	1.04	.32	1.62	3	.1	
October----	64.1	32.4	48.3	82	15	283	.82	.30	1.25	2	.9	
November---	47.3	23.4	35.4	68	-1	46	.43	.14	.67	1	2.6	
December---	37.7	18.1	27.9	56	-22	11	.27	.13	.39	0	3.9	
<b>Yearly:</b>												
Average---	60.0	31.4	45.7	---	---	---	---	---	---	---	---	
Extreme---	100	-30	---	98	-27	---	---	---	---	---	---	
Total-----	---	---	---	---	---	3,650	10.48	8.82	11.99	28	23.6	

See footnote at end of table.

## Temperature and Precipitation--Continued

Month	Temperature						Precipitation					
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have--		Average number of growing degree days*	Average	2 years in 10 will have--			Average number of days with 0.10 inch or more	Average snowfall
				Maximum temperature higher than--	Minimum temperature lower than--			Less than--	More than--	In		
°F	°F	°F	°F	°F	Units	In	In	In	In	In		
WHITEHALL AVIATION:												
January----	34.5	10.9	22.7	58	-35	18	0.44	0.17	0.66	1	6.9	
February----	43.0	16.1	29.6	61	-22	14	.17	.06	.28	0	2.5	
March-----	47.4	20.6	34.0	69	-14	46	.60	.31	.85	2	4.5	
April-----	57.4	27.3	42.3	79	7	118	.90	.33	1.38	2	2.2	
May-----	67.7	35.5	51.6	87	19	363	1.65	1.13	2.12	5	.3	
June-----	76.8	43.4	60.1	94	30	591	2.00	.65	3.10	5	.0	
July-----	85.5	46.9	66.2	97	33	803	1.17	.46	1.77	3	.0	
August-----	83.8	44.6	64.2	97	30	755	1.22	.73	1.65	3	.0	
September--	72.0	35.0	53.5	90	20	404	1.45	.71	2.09	4	.4	
October----	59.5	27.4	43.5	82	4	160	.90	.44	1.30	3	1.1	
November---	45.7	21.1	33.4	65	-12	29	.55	.39	.81	1	1.8	
December---	37.4	14.8	26.1	59	-24	12	.28	.18	.43	0	2.6	
Yearly:												
Average---	59.2	28.6	43.9	---	---	---	---	---	---	---	---	
Extreme---	100	-40	---	98	-36	---	---	---	---	---	---	
Total-----	---	---	---	---	---	3,312	11.31	9.44	13.10	29	22.2	
CARDWELL:												
January----	37.4	12.5	24.9	59	-26	13	0.43	0.17	0.80	1	3.2	
February----	41.9	15.2	28.5	66	-26	23	.42	.20	.69	2	3.3	
March-----	50.8	23.4	37.1	71	-11	53	1.17	.81	1.50	5	7.9	
April-----	61.2	29.2	45.2	84	7	195	1.29	.63	1.85	4	1.3	
May-----	68.5	37.2	52.9	90	21	400	2.53	1.29	3.61	7	.0	
June-----	78.7	43.9	61.3	96	29	637	1.84	1.13	2.47	6	.0	
July-----	86.2	48.3	67.3	98	36	843	1.32	.59	1.94	4	.0	
August-----	84.6	45.6	65.1	97	33	775	1.22	.52	1.81	3	.0	
September--	73.5	37.0	55.3	92	19	451	1.60	.53	2.48	4	.5	
October----	63.2	28.7	46.0	82	8	215	.70	.34	1.11	2	.8	
November---	45.4	20.4	32.9	69	-14	48	.54	.21	.81	2	4.3	
December---	36.3	11.8	24.0	60	-27	14	.41	.15	.63	1	4.1	
Yearly:												
Average---	60.6	29.4	45.0	---	---	---	---	---	---	---	---	
Extreme---	101	-40	---	100	-34	---	---	---	---	---	---	
Total-----	---	---	---	---	---	3,667	13.46	11.27	15.06	41	25.2	

\* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

Freeze Dates in Spring and Fall

(Recorded in the period 1961-1994 at Boulder and 1968-1977 at Whitehall Aviation)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
<b>BOULDER:</b>			
Last freezing temperature in spring:			
1 year in 10 later than--	May 23	June 11	June 27
2 years in 10 later than--	May 17	June 5	June 21
5 years in 10 later than--	May 5	May 24	June 10
First freezing temperature in fall:			
1 year in 10 earlier than--	Sept. 5	Aug. 31	Aug. 23
2 years in 10 earlier than--	Sept. 11	Sept. 5	Aug. 27
5 years in 10 earlier than--	Sept. 21	Sept. 15	Sept. 5
<b>WHITEHALL AVIATION:</b>			
Last freezing temperature in spring:			
1 year in 10 later than--	May 18	May 30	July 6
2 years in 10 later than--	May 13	May 26	June 29
5 years in 10 later than--	May 3	May 18	June 16
First freezing temperature in fall:			
1 year in 10 earlier than--	Sept. 10	Sept. 4	Aug. 24
2 years in 10 earlier than--	Sept. 14	Sept. 7	Aug. 27
5 years in 10 earlier than--	Sept. 22	Sept. 12	Sept. 1

## Growing Season

(Recorded in the period 1961-1994 at Boulder,  
1960-1967 at Whitehall, 1968-1977 at  
Whitehall Aviation, and 1978-1990 at  
Cardwell)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
<b>BOULDER:</b>			
9 years in 10	115	89	66
8 years in 10	123	98	73
5 years in 10	139	114	87
2 years in 10	155	130	100
1 year in 10	163	138	107
<b>WHITEHALL:</b>			
9 years in 10	123	97	74
8 years in 10	132	108	85
5 years in 10	149	129	106
2 years in 10	166	150	127
1 year in 10	175	161	138
<b>WHITEHALL AVIATION:</b>			
9 years in 10	118	105	53
8 years in 10	126	109	61
5 years in 10	141	116	76
2 years in 10	157	124	92
1 year in 10	165	127	100
<b>CARDWELL:</b>			
9 years in 10	124	101	62
8 years in 10	133	110	73
5 years in 10	151	126	92
2 years in 10	169	142	112
1 year in 10	179	151	123

# Formation and Classification of the Soils

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This section relates the soils in the survey area to the major factors of soil formation and describes the system of soil classification. The classification and extent of the soils in the survey area are shown in the tables "Classification of the Soils" and "Acreage and Proportionate Extent of the Soils" at the end of this section.

## Factors of Soil Formation

Soil is a natural, three-dimensional body on the earth's surface. Soil has properties that result from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over a period of time.

Although there are many different soils, each soil is the result of the interaction of the same five major factors of soil formation. These factors are the physical and chemical composition of the parent material, the effect of climate on the parent material, the kinds of plants and the organisms living in the soil, the relief of the land, and the length of time that was needed for the soil to form.

Within short distances, the combinations of these factors vary; consequently, the soils that form differ in fertility, productivity, and physical and chemical characteristics. In the following paragraphs, the factors of soil formation are described as they relate to the soils in the survey area.

## Climate

Climate, an active force in the formation of soils, is determined mainly by temperature and precipitation. Soils form in rocks that have been broken into suitable materials by erosion and by alternate periods of freezing and thawing. This weathered material is further broken down by chemical reactions, such as solution and hydration.

Precipitation and temperature affect the kind and amount of vegetation that grows on the soil. Vegetation decays and produces organic matter in the soil. Soils that are subject to cool temperatures and high precipitation generally contain more organic matter

and have darker colors than soils in areas of warm temperatures and low precipitation.

## Living Organisms

Living organisms are active in the formation of soils. Organic matter, which is produced when plants and animals decay, is the main source for the dark surface layer of a soil. Fungi and algae contribute to the decomposition of rock. As rocks decompose, grasses, shrubs, and trees are able to grow and support animal life.

The kinds of plants and animals that occur largely determine the kinds and amounts of organic material added to the soil and how this material is incorporated with the mineral parts of the soil. Roots, rodents, and insects penetrate the soil and influence its structure. Leaves, roots, and whole plants remain on the surface or in the surface layer of the soil, where they are changed to humus by micro-organisms, chemicals in the soil, and insects.

The vegetation in this survey area consists mainly of trees, shrubs, and short and mid grasses. Common rodents are gophers, badgers, and rabbits. Pebbles and stones on the surface of terraces and in many other areas were dug up by burrowing rodents.

## Topography

Topography, or relief, is mainly determined by the age of geologic formations and their resistance to erosion by water and wind. In the eroded uplands of the survey area, runoff water has carved deep valleys with many branches into the original bedrock. This rugged relief contrasts sharply with the smooth, low relief of alluvial fans, stream terraces, and the flood plains of river valleys.

In the uplands, the number and distinctness of soil horizons decrease as the slope increases. Steep soils that have a rapid runoff rate have many characteristics similar to those of soils forming in arid climates. Nearly level to moderately sloping soils have the characteristics that are typical for this survey area. Cabbart soils, for example, are mostly moderately

steep or steep. These soils do not have a B horizon. Varney soils, however, which are nearly level to moderately sloping, do have a B horizon.

## Parent Material

The soils in this survey area formed in a wide variety of parent materials. Some soils formed in alluvium derived from mixed rock sources. Other soils formed in material weathered from sandstone, shale, limestone, or igneous rocks. Soils that formed in material weathered mainly from sandstone, such as Lahood soils, are sandy because sand is the basic constituent of sandstone. Soils that formed in material weathered from shale, such as Abor soils, are clayey because clay is the basic constituent of shale. Soils that formed in mixed alluvium derived from sandstone and shale, such as Havre soils, are loamy. Soils that formed in material weathered from limestone, such as Windham soils, have a high content of lime. Soils that formed in material weathered from igneous rocks, such as Blaincreek soils, are generally loamy and have a high content of rock fragments.

## Time

Change taking place in soils over a long period of time is called soil genesis. The length of time that parent materials have been in place and exposed to climate and living organisms is generally reflected in the degree to which the soil profile has developed. The changes that occur over time give the soil distinct horizons, or layers, by which it can be recognized. The kind and arrangement of these horizons is called soil morphology. Soil morphology is described in terms of color, texture, structure, consistence, thickness, permeability, and chemistry.

Soils are classified as young to mature. The age of a soil is determined from the thickness of the A horizon, the content of organic matter, the content of clay, the depth to which soluble material has been leached, and the form and distribution of calcium carbonate and gypsum in the soil.

Havre loam, 0 to 2 percent slopes, is classified as an Entisol. This soil is a young soil that occurs on flood plains adjacent to streams. It contains little organic matter and has no accumulation of clay. Little translocation of carbonates has occurred to form a Bt or Bk horizon.

Varney soils formed in parent material similar to but much older than that in which the Havre soil formed. Varney soils formed in alluvium and are on alluvial fans and stream terraces. They are mature soils and are classified as Mollisols. They contain enough

organic matter to have a moderately dark A horizon. They have a distinct accumulation of clay in the Bt horizon, and nearly all of the carbonates have been leached to a depth below about 12 inches.

## Classification of the Soils

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

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

**SUBORDER.** Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Ustoll (*Ust*, meaning burnt, plus *oll*, from Mollisol).

**GREAT GROUP.** Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Argiustoll (*Argi*, meaning having an argillic horizon, or clay accumulation, plus *ustoll*, the suborder of the Mollisols that have a dry climate).

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

**FAMILY.** Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect

management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineralogy class, cation-exchange activity class, soil temperature regime, soil depth, and reaction class. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, superactive, frigid Calcic Argiustolls.

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

### Soil Series and Their Morphology

In this section, each soil series or family recognized in the survey area is described. The word “family” indicates that the soils were mapped at the family level. For ease of communication, a series name is assigned to each major soil mapped at the family level. Characteristics of the soil and the material in which it formed are identified for each series or family. A pedon, a small three-dimensional area of soil, that is typical of the series or family in the survey area is described. The detailed description of each soil horizon follows standards in the “Soil Survey Manual” (Soil Survey Division Staff, 1993). Many of the technical terms used in the descriptions are described in “Soil Taxonomy” (Soil Survey Staff, 1999) and in “Keys to Soil Taxonomy” (Soil Survey Staff, 1998). Unless otherwise indicated, matrix colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the series or family.

### Abor Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Very slow (less than 0.06 inch per hour)

*Landform:* Hills, knolls, and ridges

*Parent material:* Clayey alluvium over residuum derived from semiconsolidated shale interbedded with thin layers of semiconsolidated siltstone

*Slope range:* 4 to 35 percent

*Elevation range:* 4,100 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine, smectitic, frigid  
Leptic Udic Haplusterts

### Typical Pedon

Abor clay, in an area of Delpoint-Abor complex, 4 to 15 percent slopes, in rangeland, 1,850 feet south and 200 feet east of the northwest corner of sec. 23, T. 2 N., R. 1 W.

Ap—0 to 6 inches; grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) moist; moderate fine and very fine granular structure; slightly hard, friable, moderately sticky and moderately plastic; moderately alkaline (pH 8.0); abrupt smooth boundary.

Bss1—6 to 14 inches; light brownish gray (10YR 6/2) silty clay, brown (10YR 5/3) moist; strong medium prismatic structure parting to strong medium subangular blocky; hard, firm, very sticky and very plastic; many fine and very fine roots; many fine and very fine tubular pores; common intersecting slickensides; moderately alkaline (pH 8.2); clear wavy boundary.

Bss2—14 to 18 inches; light brownish gray (10YR 6/2) clay, brown (10YR 5/3) moist; moderate medium prismatic structure; hard, firm, very sticky and very plastic; many fine and very fine roots; many fine and very fine tubular pores; common intersecting slickensides; moderately alkaline (pH 8.4); gradual wavy boundary.

Bky—18 to 26 inches; grayish brown (10YR 5/2) shaly silty clay, light olive brown (2.5Y 5/4) moist; moderate medium prismatic structure; slightly hard, friable, moderately sticky and moderately plastic; common very fine roots; 20 percent semiconsolidated shale fragments; disseminated lime, common distinct lime crusts on channers; common seams and masses of gypsum; violently effervescent; moderately alkaline (pH 8.2); clear wavy boundary.

Cr—26 to 60 inches; light gray (5Y 7/2), semiconsolidated shale that rubs to clay or silty clay.

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bky horizon:* 12 to 20 inches

*Depth to Cr horizon:* 20 to 40 inches

*Percent of surface covered by stones:* 0 to 0.1 percent

*Ap horizon:*

Chroma—2 or 3

Clay content—40 to 50 percent

Calcium carbonate equivalent—0 to 3 percent

Content of rock fragments—0 to 25 percent pebbles

Reaction—pH 7.4 to 8.4

*Bss horizon:*

Value—5 or 6 dry; 4 or 5 moist  
 Chroma—2 or 3  
 Texture—silty clay or clay  
 Clay content—40 to 60 percent  
 Calcium carbonate equivalent—0 to 5 percent  
 Reaction—pH 7.4 to 8.4  
 Other features—common or many slickensides

*Bky horizon:*

Hue—2.5Y or 10YR  
 Value—5 or 6 dry  
 Chroma—2, 3, or 4  
 Texture—clay, silty clay, or clay loam  
 Clay content—40 to 60 percent  
 Content of rock fragments—5 to 25 percent  
 semiconsolidated shale fragments  
 Content of gypsum—1 to 5 percent  
 Calcium carbonate equivalent—5 to 15 percent  
 Reaction—pH 7.4 to 8.4

## Absarook Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderately slow (0.2 to 0.6 inch per hour)

*Landform:* Uplands, hills, and ridges

*Parent material:* Alluvium, colluvium, or residuum derived from hard sandstone or fine grained igneous bedrock

*Slope range:* 2 to 35 percent

*Elevation range:* 4,400 to 6,200 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Typic Argiustolls

### Typical Pedon

Absarook loam, in an area of Absarook-Beenom complex, 2 to 15 percent slopes, in rangeland, 800 feet south and 2,000 feet west of the northeast corner of sec. 18, T. 1 N., R. 1 W.

A—0 to 5 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium and fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; 5 percent pebbles; slightly acid (pH 6.2); clear wavy boundary.

Bt1—5 to 13 inches; dark grayish brown (10YR 4/2)

silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to strong fine angular blocky; hard, firm, moderately sticky and moderately plastic; many fine and very fine roots; many fine and very fine tubular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of pedis and gravel surfaces; 5 percent pebbles; slightly acid (pH 6.4); gradual wavy boundary.

Bt2—13 to 25 inches; dark grayish brown (10YR 4/2) clay loam, brown (10YR 4/3) moist; moderate coarse prismatic structure; hard, friable, moderately sticky and moderately plastic; common fine and many very fine roots; common fine and very fine tubular pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of pedis and gravel surfaces; 10 percent pebbles; slightly acid (pH 6.4); gradual wavy boundary.

Bk—25 to 32 inches; light gray (10YR 7/2) clay loam, light brownish gray (10YR 6/2) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few fine and common very fine roots; common very fine tubular pores; 10 percent pebbles; disseminated lime, few fine masses of lime, many distinct lime casts on pebbles; strongly effervescent; moderately alkaline (pH 8.2); clear smooth boundary.

R—32 inches; very dark grayish brown (10YR 3/2), hard, fractured sandstone.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 15 inches

*Depth to Bt horizon:* 4 to 9 inches

*Depth to Bk horizon:* 12 to 25 inches

*Depth to bedrock:* 20 to 40 inches

*Percent of surface covered by stones:* 0 to 0.1 percent

*A horizon:*

Hue—10YR or 2.5Y  
 Value—3 or 4 dry; 2 or 3 moist  
 Chroma—2 or 3  
 Clay content—20 to 27 percent  
 Content of rock fragments—0 to 30 percent pebbles  
 Reaction—pH 6.1 to 7.3

*Bt horizon:*

Hue—10YR or 2.5Y  
 Value—4 or 5 dry; 3, 4, or 5 moist  
 Chroma—2, 3, or 4  
 Texture—loam, clay loam, or silty clay loam

Clay content—25 to 35 percent  
 Content of rock fragments—0 to 25 percent  
 pebbles  
 Reaction—pH 6.1 to 7.8

**Bk horizon:**

Hue—10YR or 2.5Y  
 Value—5, 6, or 7 dry; 4, 5, or 6 moist  
 Chroma—2, 3, or 4  
 Texture—sandy loam, loam, or clay loam  
 Clay content—15 to 30 percent  
 Content of rock fragments—10 to 35 percent (0 to  
 5 percent cobbles, 10 to 30 percent pebbles)  
 Calcium carbonate equivalent—15 to 40 percent  
 Reaction—pH 7.9 to 8.4

**Absay Series**

*Depth class:* Very deep (greater than 60 inches)  
*Drainage class:* Well drained  
*Permeability:* Very slow (less than 0.06 inch per hour)  
*Landform:* Stream terraces and alluvial fans  
*Parent material:* Saline/sodic alluvium derived from  
 shale or siltstone  
*Slope range:* 0 to 4 percent  
*Elevation range:* 4,000 to 5,000 feet  
*Annual precipitation:* 10 to 14 inches  
*Annual air temperature:* 40 to 44 degrees F  
*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine, mixed, superactive,  
 frigid Aridic Leptic Natrustalfs

**Typical Pedon**

Absay silty clay loam, 0 to 4 percent slopes, in  
 rangeland, 1,000 feet north and 1,875 feet east of the  
 southwest corner of sec. 12, T. 1 N., R. 1 W.

E—0 to 2 inches; light brownish gray (2.5Y 6/2) silty  
 clay loam, dark grayish brown (2.5Y 4/2) moist;  
 strong medium and fine angular blocky structure;  
 hard, very firm, moderately sticky and very plastic;  
 common very fine roots; common very fine pores;  
 strongly effervescent; very strongly alkaline (pH  
 9.4); abrupt smooth boundary.

Btz—2 to 11 inches; grayish brown (10YR 5/2) silty  
 clay, dark grayish brown (10YR 4/2) moist; strong  
 coarse angular blocky structure; hard, very firm,  
 moderately sticky and very plastic; common very  
 fine roots; common very fine pores; common  
 distinct clay films on faces of peds; common fine  
 threads and masses of salt; strongly effervescent;  
 very strongly alkaline (pH 9.2); gradual irregular  
 boundary.

Btkz—11 to 15 inches; light yellowish brown (2.5Y 6/4)

silty clay loam, olive brown (2.5Y 4/4) moist;  
 moderate coarse subangular blocky structure;  
 hard, firm, moderately sticky and very plastic; few  
 very fine roots; common very fine pores; common  
 faint clay films on faces of peds; few fine masses  
 of lime; many fine threads and masses of salts;  
 strongly effervescent; moderately alkaline (pH  
 8.2); clear smooth boundary.

Bkz—15 to 60 inches; pale brown (10YR 6/3) silty  
 clay, yellowish brown (10YR 5/4) moist; massive;  
 hard, firm, moderately sticky and very plastic; few  
 very fine roots; common very fine pores;  
 disseminated lime, few fine masses of lime; many  
 medium masses and common fine threads of salt;  
 violently effervescent; moderately alkaline (pH  
 8.4).

**Range in Characteristics**

*Soil temperature:* 42 to 46 degrees F  
*Moisture control section:* Between the depths of 4 and  
 12 inches  
*Depth to Bt horizon:* 2 to 7 inches  
*Depth to Btkz horizon:* 11 to 20 inches

**E horizon:**

Hue—10YR or 2.5Y  
 Value—4 or 5 moist  
 Chroma—2 or 3  
 Clay content—27 to 35 percent  
 Content of rock fragments—0 to 15 percent  
 pebbles  
 Calcium carbonate equivalent—5 to 10 percent  
 Reaction—pH 7.9 to 9.5

**Btz horizon:**

Hue—10YR or 2.5Y  
 Value—5 or 6 dry; 4 or 5 moist  
 Chroma—2 or 3  
 Texture—silty clay loam or silty clay  
 Clay content—35 to 50 percent  
 Content of rock fragments—0 to 15 percent  
 pebbles  
 Electrical conductivity—8 to 16 mmhos/cm  
 Sodium adsorption ratio—13 to 40  
 Calcium carbonate equivalent—5 to 10 percent  
 Reaction—pH 8.5 to 9.5

**Btkz horizon:**

Hue—10YR or 2.5Y  
 Value—4 or 5 moist  
 Chroma—3 or 4  
 Texture—silty clay loam or silty clay  
 Clay content—30 to 45 percent  
 Content of rock fragments—0 to 15 percent  
 pebbles  
 Electrical conductivity—16 to 32 mmhos/cm

Sodium adsorption ratio—13 to 40  
 Calcium carbonate equivalent—5 to 10 percent  
 Reaction—pH 7.9 to 9.5

*Bkz horizon:*

Hue—10YR or 2.5Y  
 Value—6 or 7 dry; 5 or 6 moist  
 Chroma—3 or 4  
 Texture—loam, silt loam, silty clay loam, or silty clay  
 Clay content—25 to 45 percent  
 Content of rock fragments—0 to 15 percent pebbles  
 Electrical conductivity—16 to 32 mmhos/cm  
 Sodium adsorption ratio—5 to 25  
 Calcium carbonate equivalent—5 to 15 percent  
 Reaction—pH 7.9 to 9.0

## Adel Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans and side slopes of mountains

*Parent material:* Alluvium derived from fine grained sandstone and igneous rock

*Slope range:* 1 to 60 percent

*Elevation range:* 5,500 to 8,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Fine-loamy, mixed, superactive Pachic Haplocryolls

### Typical Pedon

Adel loam, in an area of Adel-Libeg complex, 4 to 15 percent slopes, stony, in rangeland, 1,950 feet east and 850 feet south of the northwest corner of sec. 4, T. 5 N., R. 2 W.

A—0 to 9 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; moderate medium and fine granular structure; slightly hard, very friable, slightly sticky and nonplastic; many fine and very fine roots; many very fine pores; 10 percent pebbles; neutral (pH 6.8); clear wavy boundary.

Bw1—9 to 20 inches; dark brown (10YR 3/3) gravelly loam, very dark brown (10YR 2/2) moist; moderate medium and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots;

many very fine and fine pores; 20 percent pebbles; neutral (pH 7.2); gradual wavy boundary.

Bw2—20 to 32 inches; brown (10YR 4/3) gravelly loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; many fine and very fine pores; 25 percent pebbles; neutral (pH 7.2); gradual irregular boundary.

C—32 to 60 inches; brown (10YR 5/3) very gravelly loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine pores; 35 percent pebbles; slightly alkaline (pH 7.4).

### Range in Characteristics

*Soil temperature:* 37 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 16 to 40 inches

*Percent of surface covered by stones:* 0 to 3 percent

*A horizon:*

Value—2, 3, or 4 dry; 2 or 3 moist

Chroma—1 or 2

Clay content—18 to 27 percent

Content of rock fragments—0 to 15 percent (0 to 5 percent cobbles, 0 to 10 percent pebbles)

Reaction—pH 6.1 to 7.3

*Bw horizon:*

Value—3, 4, or 5 dry; 2 or 3 moist

Chroma—1, 2, or 3

Clay content—18 to 27 percent

Content of rock fragments—0 to 35 percent (0 to 5 percent cobbles, 0 to 30 percent pebbles)

Reaction—pH 6.1 to 7.8

*C horizon:*

Hue—2.5Y or 10YR

Value—4 or 5 dry; 3 or 4 moist

Chroma—2 or 3

Texture—loam or sandy loam

Clay content—10 to 27 percent

Content of rock fragments—15 to 35 percent (0 to 5 percent cobbles, 15 to 35 percent pebbles)

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 6.1 to 7.8

## Amesha Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, hills, and sedimentary plains

*Parent material:* Alluvium, colluvium, and Tertiary valley fill material

*Slope range:* 0 to 60 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Coarse-loamy, mixed, superactive, frigid Aridic Calcustepts

### Typical Pedon

Amesha loam, 2 to 8 percent slopes, in rangeland, 1,600 feet west and 1,300 feet north of the southeast corner of sec. 34, T. 2 N., R. 4 W.

A—0 to 4 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; 10 percent pebbles; disseminated lime; slightly effervescent; slightly alkaline (pH 7.6); abrupt smooth boundary.

Bk1—4 to 9 inches; brown (10YR 5/3) loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular and interstitial pores; 10 percent pebbles; disseminated lime, common fine threads and masses of lime, common distinct lime coatings on undersides of pebbles; violently effervescent; moderately alkaline (pH 8.4); clear wavy boundary.

Bk2—9 to 22 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; weak medium and coarse prismatic structure parting to strong medium and coarse subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine and few medium roots; many very fine and fine tubular pores; 10 percent pebbles; disseminated lime, common fine threads and masses of lime, many distinct lime coatings on undersides of fragments; violently effervescent; moderately alkaline (pH 8.4); clear wavy boundary.

Bk3—22 to 34 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 5/3) moist; weak coarse prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine and fine tubular pores; 15 percent

pebbles; disseminated lime, many fine threads and masses of lime, many distinct lime coatings on fragments; violently effervescent; moderately alkaline (pH 8.4); gradual wavy boundary.

BC—34 to 60 inches; light yellowish brown (10YR 6/4) gravelly sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; 25 percent pebbles; disseminated lime, many fine threads and masses of lime, many distinct lime coatings on fragments; violently effervescent; moderately alkaline (pH 8.2).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches

*Depth to Bk horizon:* 4 to 8 inches

*Percent of surface covered by stones:* 0 to 0.1 percent

*A horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2 or 3

Texture—loam or silt loam

Clay content—15 to 25 percent

Content of rock fragments—0 to 25 percent (0 to 10 percent cobbles, 0 to 15 percent pebbles)

Calcium carbonate equivalent—5 to 10 percent

Reaction—pH 7.4 to 8.4

*Bk horizon:*

Hue—10YR or 2.5Y

Value—5, 6, 7, or 8 dry; 4, 5, 6, or 7 moist

Chroma—2, 3, or 4

Texture—loam, silt loam, or sandy loam

Clay content—10 to 18 percent

Content of rock fragments—5 to 15 percent pebbles

Calcium carbonate equivalent—15 to 35 percent

Reaction—pH 7.9 to 8.4

*BC horizon:*

Hue—7.5YR, 10YR, or 2.5Y

Value—6 or 7 dry; 5 or 6 moist

Chroma—2, 3, or 4

Texture—sandy loam or loam

Clay content—10 to 18 percent

Content of rock fragments—10 to 35 percent pebbles

Calcium carbonate equivalent—10 to 25 percent

Reaction—pH 7.9 to 8.4

## Anamac Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, stream terraces, and hills

*Parent material:* Alluvium derived from mixed rock sources

*Slope range:* 0 to 15 percent

*Elevation range:* 4,000 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Aridic Haplustolls

### Typical Pedon

Anamac loam, 0 to 2 percent slopes, in cropland, 50 feet north and 2,190 feet east of the southwest corner of sec. 34, T. 2 N., R. 4 W.

Ap—0 to 4 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; strong fine and medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and few fine roots; slightly alkaline (pH 7.4); abrupt smooth boundary.

Bw—4 to 12 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak medium prismatic structure parting to moderate medium and coarse subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine, common fine, and few medium pores; slightly alkaline (pH 7.4); clear smooth boundary.

Bk1—12 to 18 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; weak medium and coarse prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine, common fine, and few medium tubular pores; 5 percent pebbles; disseminated lime, few fine masses of lime, common distinct lime coatings on undersides of fragments; strongly effervescent; moderately alkaline (pH 8.2); clear wavy boundary.

Bk2—18 to 31 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; weak coarse prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine and common fine pores; 5 percent pebbles; disseminated lime, few fine masses and threads of lime, common distinct lime

coatings on undersides of fragments; violently effervescent; moderately alkaline (pH 8.4); gradual wavy boundary.

BC—31 to 60 inches; very pale brown (10YR 7/4) loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; common very fine and few coarse roots; many very fine pores; 5 percent pebbles; violently effervescent; moderately alkaline (pH 8.2).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 15 inches

*Depth to Bk horizon:* 11 to 24 inches

*Ap horizon:*

Hue—10YR or 2.5Y

Chroma—2 or 3

Texture—loam, silt loam, or clay loam

Clay content—18 to 30 percent

Content of rock fragments—0 to 25 percent (0 to 10 percent cobbles, 0 to 15 percent pebbles)

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 7.4 to 8.4; pH 7.4 to 9.0 in the saline phase

Electrical conductivity—8 to 16 mmhos/cm (saline phase)

Sodium adsorption ratio—13 to 30 (saline phase)

*Bw horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2, 3, or 4

Texture—loam or clay loam

Clay content—18 to 35 percent

Content of rock fragments—0 to 15 percent pebbles

Calcium carbonate equivalent—0 to 10 percent

Reaction—pH 7.4 to 8.4; pH 8.5 to 9.6 in the saline phase

Electrical conductivity—16 to 40 mmhos/cm (saline phase)

Sodium adsorption ratio—13 to 40 (saline phase)

*Bk horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—loam or clay loam

Clay content—18 to 30 percent

Content of rock fragments—0 to 15 percent pebbles

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.9 to 9.0; pH 8.5 to 9.6 in the saline phase  
 Electrical conductivity—8 to 25 mmhos/cm (saline phase)  
 Sodium adsorption ratio—13 to 40 (saline phase)

**BC horizon:**

Hue—7.5YR, 10YR, or 2.5Y  
 Value—5, 6, or 7 dry; 4, 5, or 6 moist  
 Chroma—2, 3, or 4  
 Texture—sandy loam, loam, or clay loam  
 Clay content—10 to 30 percent  
 Content of rock fragments—5 to 25 percent pebbles  
 Calcium carbonate equivalent—3 to 10 percent  
 Reaction—pH 7.9 to 9.0; pH 7.9 to 9.0 in the saline phase  
 Electrical conductivity—2 to 16 mmhos/cm (saline phase)  
 Sodium adsorption ratio—4 to 20 (saline phase)

**Arrowpeak Family**

*Depth class:* Shallow (10 to 20 inches)  
*Drainage class:* Well drained  
*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)  
*Landform:* Upper side slopes and ridges of mountains  
*Parent material:* Residuum or colluvium derived from fine grained igneous rocks  
*Slope range:* 4 to 60 percent  
*Elevation range:* 5,500 to 8,000 feet  
*Annual precipitation:* 15 to 30 inches  
*Annual air temperature:* 36 to 40 degrees F  
*Frost-free period:* 30 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Lithic Haplocryolls

**Typical Pedon**

Arrowpeak very cobbly loam, in an area of Sebud, stony-Surdal, stony-Arrowpeak, very stony, complex, 35 to 60 percent slopes, in rangeland, 850 feet north and 500 feet west of the southeast corner of sec. 13, T. 3 N., R. 4 W.

A—0 to 8 inches; very dark grayish brown (10YR 3/2) very cobbly loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; soft, very friable, slightly sticky and nonplastic; many fine and very fine and few medium roots; 20 percent angular pebbles and 20 percent angular cobbles; neutral (pH 7.0); clear wavy boundary.

Bw—8 to 12 inches; olive brown (2.5Y 4/4) very cobbly

loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many fine and very fine and few medium roots; many very fine pores; 20 percent angular pebbles and 30 percent angular cobbles; neutral (pH 7.0); clear wavy boundary.

BC—12 to 18 inches; grayish brown (10YR 5/2) very cobbly loam, dark grayish brown (10YR 4/2) moist; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; 20 percent angular pebbles and 40 percent angular cobbles; neutral (pH 7.0); clear wavy boundary.

R—18 inches; hard, fractured fine grained igneous bedrock.

**Range in Characteristics**

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 8 and 20 inches

*Thickness of the mollic epipedon:* 7 to 12 inches

*Depth to bedrock:* 10 to 20 inches

*Percent of surface covered by stones/boulders:* 0 to 3 percent

**A horizon:**

Value—3 or 4 dry; 2 or 3 moist  
 Clay content—15 to 27 percent  
 Content of rock fragments—15 to 60 percent (10 to 25 percent pebbles or channers, 5 to 30 percent cobbles, 0 to 5 percent stones)  
 Reaction—pH 6.1 to 7.3

**Bw horizon:**

Value—4 or 5 dry; 3 or 4 moist  
 Chroma—2, 3, or 4  
 Clay content—10 to 25 percent  
 Content of rock fragments—40 to 80 percent (20 to 30 percent pebbles, 20 to 45 percent cobbles, 0 to 5 percent stones)  
 Reaction—pH 6.1 to 7.3

**BC horizon:**

Value—5 or 6 dry; 4 or 5 moist  
 Chroma—2 or 3  
 Clay content—10 to 25 percent  
 Content of rock fragments—40 to 80 percent (20 to 30 percent pebbles, 20 to 45 percent cobbles, 0 to 5 percent stones)  
 Reaction—pH 6.1 to 7.3

**Ashbray Series**

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Somewhat excessively drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Upper side slopes of hills and escarpments

*Parent material:* Residuum derived from granite

*Slope range:* 2 to 70 percent

*Elevation range:* 4,500 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, nonacid, frigid Lithic Ustorthents

### Typical Pedon

Ashbray gravelly coarse sandy loam, in an area of Ashbray, rubbly-Rock outcrop-Kellygulch, very stony, complex, 35 to 70 percent slopes; in a forested area, 1,900 feet north and 2,175 feet east of the southwest corner of sec. 17, T. 4 N., R. 3 W.

Oi— $\frac{1}{2}$  inch to 0; partially decomposed needles, twigs, and leaves.

A—0 to 4 inches; grayish brown (10YR 5/2) gravelly coarse sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and common fine pores; 30 percent granite pebbles; neutral (pH 6.8); clear smooth boundary.

C—4 to 14 inches; pale brown (10YR 6/3) very gravelly coarse sandy loam, brown (10YR 5/3) moist; single grain; loose, nonsticky and nonplastic; common very fine and fine roots; 50 percent granite pebbles; neutral (pH 7.2); clear wavy boundary.

Cr—14 to 17 inches; yellowish brown (10YR 5/4), decomposed granite bedrock (grus) that crushes to very gravelly coarse sand.

R—17 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Cr horizon:* 8 to 18 inches

*Depth to R layer:* 12 to 20 inches

*Percent of surface covered by stones/boulders:* 0.1 to 30 percent

*A horizon:*

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Clay content—10 to 20 percent

Content of rock fragments—15 to 35 percent (5 to 20 percent cobbles and stones, 10 to 30 percent pebbles)

Reaction—pH 6.1 to 7.3

*C horizon:*

Value—6 or 7 dry; 5, 6, or 7 moist

Chroma—2, 3, or 4

Clay content—5 to 18 percent

Content of rock fragments—15 to 60 percent (0 to 10 percent cobbles and stones, 15 to 50 percent pebbles)

Reaction—pH 6.1 to 7.3

### Attewan Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour) above the 2C horizon and rapid (6.0 to 20.0 inches per hour) in the 2C horizon

*Landform:* Stream terraces and plains

*Parent material:* Alluvium derived from mixed rock sources

*Slope range:* 0 to 2 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Aridic Argiustolls

### Typical Pedon

Attewan cobbly loam, in an area of Attewan-Nippt complex, 0 to 2 percent slopes, in pasture, 1,800 feet south and 1,200 feet east of the northwest corner of sec. 6, T. 9 N., R. 2 W.

A—0 to 2 inches; dark grayish brown (10YR 4/2) cobbly loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many fine roots; 10 percent pebbles and 10 percent cobbles; neutral (pH 7.3); clear smooth boundary.

Bt1—2 to 6 inches; grayish brown (2.5Y 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, friable, moderately sticky and slightly plastic; many fine roots; common fine and very fine pores; common distinct dark grayish brown (10YR 3/2) clay films on faces of peds; 10 percent pebbles; slightly alkaline (pH 7.6); clear smooth boundary.

Bt2—6 to 16 inches; pale brown (10YR 6/3) loam, dark

grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, firm, slightly sticky and slightly plastic; many very fine roots; common fine and very fine pores; common distinct dark grayish brown (10YR 3/2) clay films on faces of peds; 10 percent pebbles; slightly alkaline (pH 7.4); clear smooth boundary.

**Bk**—16 to 22 inches; light gray (10YR 7/2) loam, grayish brown (10YR 5/2) moist; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and many very fine roots; many fine and very fine pores; 10 percent pebbles; disseminated lime, common fine masses and threads of lime, common faint lime coatings on undersides of rock fragments; strongly effervescent; moderately alkaline (pH 8.0); clear wavy boundary.

**2C**—22 to 60 inches; light yellowish brown (10YR 6/4) extremely gravelly loamy coarse sand, dark yellowish brown (10YR 4/4) moist; single grain; loose, nonsticky and nonplastic; 45 percent pebbles and 20 percent cobbles; disseminated lime, common distinct lime crusts on undersides of rock fragments in the upper part; strongly effervescent; moderately alkaline (pH 8.0).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 9 inches

*Depth to Bt horizon:* 2 to 8 inches

*Depth to Bk horizon:* 12 to 18 inches

*Depth to 2C horizon:* 20 to 40 inches

#### *A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 2 or 3 moist

Chroma—2 or 3

Clay content—10 to 20 percent

Content of rock fragments—15 to 35 percent (10 to 20 percent cobbles, 5 to 15 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *Bt horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 3 or 4 moist

Chroma—2 or 3

Texture—clay loam or loam

Clay content—20 to 35 percent

Content of rock fragments—0 to 25 percent (0 to 5 percent cobbles, 0 to 20 percent pebbles)

Reaction—pH 6.6 to 7.8

#### *Bk horizon:*

Hue—10YR or 2.5Y

Value—7 or 8 dry; 5 or 6 moist

Chroma—2, 3, or 4

Texture—loam, sandy clay loam, or sandy loam

Clay content—15 to 30 percent

Content of rock fragments—0 to 30 percent (0 to 5 percent cobbles, 0 to 25 percent pebbles)

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.4 to 8.4

#### *2C horizon:*

Hue—2.5Y or 10YR

Value—5 or 6 dry; 4 or 5 moist

Chroma—3 or 4

Texture—loamy sand, sand, loamy coarse sand, or coarse sand

Clay content—0 to 10 percent

Content of rock fragments—35 to 75 percent (0 to 15 percent stones and cobbles, 35 to 60 percent pebbles)

Calcium carbonate equivalent—1 to 15 percent

Reaction—pH 7.4 to 8.4

## Baxton Series

*Depth class:* Moderately deep (20 to 40 inches) to weathered granite bedrock (grus) and deep (40 to 60 inches) to hard granite bedrock

*Drainage class:* Somewhat excessively drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Mountains, hills, and ridges

*Parent material:* Local colluvium, slope alluvium, and residuum derived from granite

*Slope range:* 2 to 60 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Coarse-loamy, mixed, superactive, frigid Typic Haplustolls

### Typical Pedon

Baxton coarse sandy loam, in an area of Baxton, stony-Breeton, bouldery-Catgulch, very stony, complex, 15 to 35 percent slopes, in rangeland, 2,200 feet north and 2,350 feet east of the southwest corner of sec. 26, T. 8 N., R. 4 W.

**A**—0 to 11 inches; dark grayish brown (10YR 4/2) coarse sandy loam, very dark brown (10YR 2/2) moist; weak fine and very fine granular structure;

soft, very friable, slightly sticky and nonplastic; many very fine and few fine, medium, and coarse roots; many very fine and fine pores; 10 percent granite pebbles; neutral (pH 6.8); clear smooth boundary.

Bw1—11 to 22 inches; yellowish brown (10YR 5/4) gravelly coarse sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine and few fine, medium, and coarse roots; common very fine and fine pores; 20 percent granite pebbles; neutral (pH 7.2); clear wavy boundary.

Bw2—22 to 31 inches; light yellowish brown (10YR 6/4) gravelly coarse sandy loam, yellowish brown (10YR 5/4) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common very fine and few fine, medium, and coarse roots; common very fine and fine pores; 30 percent granite pebbles; neutral (pH 7.3); clear wavy boundary.

Cr—31 to 57 inches; reddish yellow (7.5YR 6/6), decomposed granite bedrock (grus) that crushes to very gravelly loamy coarse sand.

R—57 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches

*Thickness of the mollic epipedon:* 7 to 14 inches

*Depth to Cr horizon:* 20 to 40 inches

*Depth to R layer:* 40 to 60 inches

*Percent of surface covered by stones/boulders:* 0 to 15 percent

#### A horizon:

Value—3, 4, or 5 dry; 2 or 3 moist

Chroma—2 or 3

Texture—loam, sandy loam, or coarse sandy loam

Clay content—10 to 20 percent

Content of rock fragments—5 to 15 percent pebbles

Reaction—pH 6.1 to 7.3

#### Bw1 horizon:

Value—5 or 6 dry; 4 or 5 moist

Chroma—3 or 4

Texture—sandy loam or coarse sandy loam

Clay content—8 to 18 percent

Content of rock fragments—10 to 35 percent pebbles

Reaction—pH 6.1 to 7.3

#### Bw2 horizon:

Value—6 or 7 dry; 4, 5, or 6 moist

Chroma—3, 4, or 6

Texture—coarse sandy loam or loamy coarse sand

Clay content—5 to 15 percent

Content of rock fragments—15 to 35 percent pebbles

Reaction—pH 6.1 to 7.3

## Beanlake Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, outwash fans, and moraines

*Parent material:* Alpine till or alluvium

*Slope range:* 4 to 15 percent

*Elevation range:* 4,400 to 5,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Typic Calcicustolls

### Typical Pedon

Beanlake stony loam, in an area of Beanlake-Winspect stony loams, 4 to 25 percent slopes, in rangeland, 2,500 feet north and 2,200 feet east of the southwest corner of sec. 19, T. 20 N., R. 7 W., Lewis and Clark County, Montana:

A—0 to 6 inches; dark grayish brown (10YR 4/2) stony loam, very dark grayish brown (10YR 3/2) moist; moderate very fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; 10 percent pebbles and 5 percent stones; slightly alkaline; clear smooth boundary.

Bk—6 to 16 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; weak medium prismatic structure parting to weak medium and fine subangular blocky; slightly hard, very friable, sticky and slightly plastic; common very fine roots; many very fine tubular and interstitial pores; 5 percent pebbles and 5 percent cobbles; disseminated lime, continuous faint lime casts on undersides of fragments; violently effervescent; moderately alkaline; gradual smooth boundary.

Bky1—16 to 38 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; weak medium and fine subangular blocky structure; slightly hard, friable, sticky and slightly plastic; common very fine roots; many very fine tubular and interstitial pores; 5 percent cobbles; disseminated lime, continuous faint lime casts on undersides of fragments; common fine seams of gypsum;

violently effervescent; moderately alkaline; gradual smooth boundary.

**Bky2**—38 to 60 inches; light gray (2.5Y 7/2) cobbly loam, brown (10YR 5/3) moist; weak medium and fine subangular blocky structure; hard, friable, sticky and slightly plastic; few very fine roots; common very fine tubular and interstitial pores; 15 percent pebbles and 20 percent cobbles; disseminated lime, continuous faint lime casts on undersides of fragments; common fine seams and masses of gypsum; violently effervescent; moderately alkaline.

### Range in Characteristics

*Soil temperature:* 42 to 47 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 8 inches

#### *A horizon:*

Value—4 or 5 dry; 2 or 3 moist

Chroma—1 or 2

Clay content—15 to 25 percent

Content of rock fragments—15 to 30 percent (5 to 15 percent cobbles and stones, 10 to 15 percent pebbles)

Reaction—pH 7.4 to 8.4

#### *Bk horizon:*

Hue—10YR

Value—5, 6, 7, or 8 dry; 3, 4, 5, or 6 moist

Chroma—2 or 3

Clay content—18 to 25 percent

Calcium carbonate equivalent—15 to 25 percent

Content of rock fragments—10 to 35 percent (0 to 20 percent cobbles and stones, 5 to 15 percent pebbles)

Reaction—pH 7.9 to 8.4

#### *Bky1 horizon:*

Hue—10YR or 2.5Y

Value—7 or 8 dry; 5 or 6 moist

Chroma—2 or 3

Clay content—18 to 25 percent

Electrical conductivity—0 to 4 mmhos/cm

Calcium carbonate equivalent—15 to 25 percent

Content of gypsum—1 to 3 percent

Content of rock fragments—10 to 35 percent (0 to 20 percent cobbles and stones, 5 to 15 percent pebbles)

Reaction—pH 7.9 to 9.0

#### *Bky2 horizon:*

Hue—10YR or 2.5Y

Value—6 or 7 dry; 4 or 5 moist

Chroma—2 or 3

Clay content—18 to 25 percent

Electrical conductivity—0 to 4 mmhos/cm

Content of gypsum—1 to 3 percent

Calcium carbonate equivalent—5 to 15 percent

Content of rock fragments—15 to 40 percent (0 to 5 percent stones, 10 to 20 percent cobbles, 5 to 15 percent pebbles)

Reaction—pH 7.9 to 9.0

Other features—bulk density of more than 1.6 grams per cubic centimeter

## Beaverell Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour) above the 2C horizon and rapid (6.0 to 20.0 inches per hour) in the 2C horizon

*Landform:* Alluvial fans and plains

*Parent material:* Gravelly and cobbly alluvium derived from mixed rock sources

*Slope range:* 0 to 15 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Loamy-skeletal over sandy or sandy-skeletal, mixed, superactive, frigid Aridic Argiustolls

### Typical Pedon

Beaverell very cobbly sandy clay loam, in an area of Beaverell, very stony-Sieberell, stony, complex, 4 to 15 percent slopes, in rangeland, 700 feet north and 300 feet west of the southeast corner of sec. 10, T. 4 N., R. 3 W.

**A**—0 to 5 inches; grayish brown (10YR 5/2) very cobbly sandy clay loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine roots; many fine and medium pores; 35 percent rounded cobbles and 15 percent rounded pebbles; slightly alkaline (pH 7.4); clear smooth boundary.

**Bt**—5 to 12 inches; yellowish brown (10YR 5/4) extremely cobbly sandy clay loam, olive brown (2.5Y 4/4) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; many fine and very fine roots; many fine and very fine pores; many faint clay films on faces of peds; 35 percent rounded pebbles and 30 percent rounded cobbles; slightly alkaline (pH 7.4); clear smooth boundary.

**Bk**—12 to 16 inches; grayish brown (2.5Y 5/2) extremely cobbly sandy loam, olive brown (2.5Y 4/4) moist; weak medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; many fine and very fine roots; many fine and very fine pores; 40 percent cobbles and stones, 35 percent rounded pebbles; disseminated lime, common faint lime coatings on undersides of fragments; strongly effervescent; moderately alkaline (pH 7.9); gradual wavy boundary.

**2C**—16 to 60 inches; light yellowish brown (2.5Y 6/4) extremely cobbly coarse sand, light olive brown (2.5Y 5/4) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; 40 percent cobbles and stones, 35 percent rounded pebbles; common faint lime coatings on undersides of fragments in the upper part; slightly effervescent; slightly alkaline (pH 7.8).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 9 inches

*Depth to Bt horizon:* 4 to 9 inches

*Depth to Bk horizon:* 10 to 20 inches

*Percent of surface covered by stones/boulders:* 0 to 20 percent

#### *A horizon:*

Value—2 or 3 moist

Chroma—2 or 3

Texture—loam or sandy clay loam

Clay content—15 to 30 percent

Content of rock fragments—25 to 70 percent (15 to 40 percent cobbles and stones, 10 to 30 percent pebbles)

Reaction—pH 6.6 to 7.8

#### *Bt horizon:*

Hue—10YR or 2.5Y

Value—3, 4, or 5 dry; 2, 3, or 4 moist

Chroma—2, 3, or 4

Texture—clay loam or sandy clay loam

Clay content—20 to 35 percent

Content of rock fragments—35 to 70 percent (20 to 35 percent cobbles, 15 to 35 percent pebbles)

Reaction—pH 6.6 to 7.8

#### *Bk horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—coarse sandy loam or sandy loam

Clay content—10 to 20 percent

Content of rock fragments—35 to 75 percent (5 to 40 percent cobbles and stones, 30 to 45 percent pebbles)

Calcium carbonate equivalent—5 to 10 percent

Reaction—pH 7.4 to 8.4

#### *2C horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 (dry or moist)

Chroma—3, 4, or 6

Texture—loamy coarse sand or coarse sand

Clay content—0 to 10 percent

Content of rock fragments—35 to 80 percent (5 to 40 percent cobbles and stones, 30 to 60 percent pebbles)

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 7.4 to 8.4

## Beenom Series

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Hills, ridges, and escarpments

*Parent material:* Residuum derived from coarse grained sandstone

*Slope range:* 2 to 45 percent

*Elevation range:* 4,200 to 6,000 feet

*Annual precipitation:* 12 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy, mixed, superactive, frigid Aridic Lithic Argiustolls

### Typical Pedon

Beenom loam, in an area of Beenom, stony-Wimper-Whitlash, very stony, complex, 4 to 15 percent slopes, in rangeland, 1,000 feet west and 1,375 feet south of the northeast corner of sec. 18, T. 1 N., R. 1 W.

**A**—0 to 2 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and very fine roots; 10 percent angular pebbles; neutral (pH 7.2); clear wavy boundary.

**Bt1**—2 to 8 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; strong medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; many fine and very fine roots; many fine and very fine tubular pores; common faint

brown (10YR 4/3) clay films on faces of peds; 10 percent angular pebbles; slightly alkaline (pH 7.4); clear wavy boundary.

Bt2—8 to 12 inches; brown (10YR 5/3) gravelly clay loam, brown (10YR 4/3) moist; moderate medium prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine and fine pores; many faint brown (10YR 4/3) clay films on faces of peds; 20 percent angular pebbles; slightly alkaline (pH 7.4); clear wavy boundary.

BC—12 to 16 inches; brown (10YR 5/3) gravelly coarse sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; 30 percent angular pebbles; neutral (pH 6.6); clear smooth boundary.

R—16 inches; hard, brown (10YR 4/3), coarse grained sandstone.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 11 inches

*Depth to Bt horizon:* 2 to 9 inches

*Depth to bedrock:* 10 to 20 inches

*Percent of surface covered by stones:* 0 to 0.1 percent

#### *A horizon:*

Value—3, 4, or 5 dry; 2 or 3 moist

Chroma—2 or 3

Clay content—18 to 27 percent

Content of rock fragments—5 to 25 percent (0 to 5 percent cobbles, 5 to 20 percent pebbles)

Reaction—pH 6.1 to 7.8

#### *Bt horizon:*

Value—3, 4, or 5 dry; 2, 3, or 4 moist

Chroma—2 or 3

Texture—clay loam, loam, or sandy clay loam

Clay content—25 to 35 percent

Content of rock fragments—5 to 25 percent (0 to 5 percent cobbles, 5 to 20 percent pebbles)

Reaction—pH 6.6 to 7.8

#### *BC horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 3 or 4 moist

Chroma—2 or 3

Texture—sandy loam or coarse sandy loam

Clay content—10 to 20 percent

Content of rock fragments—15 to 35 percent (0 to 5 percent cobbles, 10 to 30 percent pebbles)

Reaction—pH 6.1 to 7.3

## Benz Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Slow (0.06 to 0.2 inch per hour)

*Landform:* Alluvial fans

*Parent material:* Saline/sodic alluvium derived mainly from shale

*Slope range:* 2 to 8 percent

*Elevation range:* 4,000 to 4,600 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, calcareous, frigid Aridic Ustorthents

### Typical Pedon

Benz clay loam, in an area of Trudau-Benz clay loams, 2 to 8 percent slopes, in cropland, 1,100 feet south and 950 feet west of the northeast corner of sec. 2, T. 1 N., R. 3 W.

Ap1—0 to 2 inches; grayish brown (10YR 5/2) clay loam, brown (10YR 4/3) moist; moderate medium platy structure; hard, friable, slightly sticky and slightly plastic; few very fine roots between plates; many vesicular pores; 5 percent shale fragments; disseminated lime; slightly effervescent; strongly alkaline (pH 8.8); clear wavy boundary.

Ap2—2 to 8 inches; grayish brown (10YR 5/2) clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; 5 percent shale fragments; disseminated lime; slightly effervescent; strongly alkaline (pH 8.8); clear wavy boundary.

Ckz1—8 to 31 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, slightly sticky and nonplastic; common very fine roots; common fine and very fine pores; 5 percent shale fragments; disseminated lime, common fine threads and masses of lime; common fine threads and masses of gypsum and salt crystals; violently effervescent; very strongly alkaline (pH 9.4); diffuse wavy boundary.

Ckz2—31 to 44 inches; light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; few fine and very fine roots; few fine and very fine pores; 25 percent shale fragments; disseminated lime, common fine and very fine threads and masses of lime; common fine threads and masses of gypsum and salt crystals; strongly

effervescent; very strongly alkaline (pH 9.6); diffuse wavy boundary.

C—44 to 60 inches; light brownish gray (2.5Y 6/2) loam stratified with thin lenses of fine sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots and pores; 50 percent shale fragments; few fine threads of lime; few fine threads of gypsum and salt crystals; slightly effervescent; very strongly alkaline (pH 9.6).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Ckz horizon:* 8 to 12 inches

*Ap horizon:*

Hue—2.5Y or 10YR

Value—5, 6, or 7 dry; 3, 4, or 5 moist

Chroma—2 or 3

Texture—loam or clay loam

Clay content—18 to 35 percent

Electrical conductivity—4 to 8 mmhos/cm

Sodium adsorption ratio—4 to 13

Calcium carbonate equivalent—5 to 10 percent

Reaction—pH 7.4 to 9.0

*Ckz1 horizon:*

Hue—2.5Y or 10YR

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2 or 3

Texture—loam or clay loam

Clay content—18 to 35 percent

Electrical conductivity—8 to 16 mmhos/cm

Sodium adsorption ratio—13 to 30

Calcium carbonate equivalent—5 to 15 percent

Content of gypsum—2 to 5 percent

Reaction—pH 8.5 to 9.6

*Ckz2 and C horizons:*

Hue—2.5Y or 10YR

Value—6 or 7 dry; 4, 5, or 6 moist

Chroma—2 or 3

Texture—loam or clay loam with thin strata of fine sandy loam or sandy loam

Clay content—10 to 30 percent

Electrical conductivity—8 to 16 mmhos/cm

Sodium adsorption ratio—13 to 30

Calcium carbonate equivalent—3 to 15 percent

Content of gypsum—2 to 5 percent

Reaction—pH 8.5 to 9.6

## Bielenberg Series

*Depth class:* Deep (40 to 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Ridges and side slopes of hills

*Parent material:* Alluvium, colluvium, and residuum derived from granite

*Slope range:* 4 to 70 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Typic Argiustolls

### Typical Pedon

Bielenberg sandy clay loam, in an area of Clancy-Bielenberg-Connieo complex, 4 to 15 percent slopes, in rangeland, 1,350 feet south and 150 feet east of the northwest corner of sec. 29, T. 9 N., R. 2 W.

A1—0 to 3 inches; very dark grayish brown (10YR 3/2) sandy clay loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine and common medium roots; many very fine and fine pores; 3 percent pebbles; slightly acid (pH 6.2); clear wavy boundary.

A2—3 to 9 inches; very dark grayish brown (10YR 3/2) coarse sandy loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and common fine pores; 10 percent pebbles; slightly acid (pH 6.2); clear wavy boundary.

BA—9 to 15 inches; brown (10YR 4/3) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine and few medium roots; many very fine and common fine pores; 10 percent pebbles; slightly acid (pH 6.4); gradual wavy boundary.

Bt—15 to 28 inches; yellowish brown (10YR 5/4) sandy clay loam, brown (10YR 4/3) moist; strong medium prismatic structure; hard, firm, moderately sticky and moderately plastic; few very fine, fine,

and medium roots; common very fine and fine pores; few faint clay films on faces of peds; 10 percent pebbles; neutral (pH 6.6); gradual wavy boundary.

BC—28 to 50 inches; light yellowish brown (10YR 6/4) gravelly coarse sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; few fine and very fine roots; common very fine and few fine pores; 5 percent cobbles, 25 percent pebbles; neutral (pH 6.8); gradual irregular boundary.

Cr—50 to 55 inches; yellowish brown (10YR 5/4), decomposed granite bedrock (grus) that crushes to very gravelly loamy coarse sand or coarse loamy sand.

R—55 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 15 inches

*Depth to Bt horizon:* 7 to 22 inches

*Depth to Cr horizon:* 40 to 58 inches

*Depth to R layer:* 43 to 60 inches

*Percent of surface covered by stones:* 0 to 3 percent

#### *A horizon:*

Value—3, 4, or 5 dry; 2 or 3 moist

Chroma—2 or 3

Texture—loam or sandy clay loam

Clay content—18 to 27 percent

Content of rock fragments—0 to 25 percent (0 to 5 percent cobbles, 0 to 20 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *BA horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 3 or 4 moist

Chroma—2 or 3

Texture—sandy clay loam or coarse sandy loam

Clay content—18 to 25 percent

Content of rock fragments—0 to 25 percent (0 to 5 percent cobbles, 0 to 20 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *Bt horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—3 or 4

Clay content—18 to 27 percent

Content of rock fragments—5 to 35 percent (0 to 5 percent cobbles, 5 to 30 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *BC horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—3, 4, or 6

Texture—sandy loam or coarse sandy loam

Clay content—10 to 20 percent

Content of rock fragments—15 to 50 percent (0 to 10 percent cobbles, 15 to 40 percent pebbles)

Reaction—pH 6.1 to 7.8

## Bignell Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Slow (0.06 to 0.2 inch per hour)

*Landform:* Alluvial fans and sides of hills

*Parent material:* Alluvium, colluvium, and alpine till derived from mixed rock sources

*Slope range:* 15 to 35 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 38 to 42 degrees F

*Frost-free period:* 90 to 105 days

**Taxonomic classification:** Clayey-skeletal, mixed, superactive, frigid Typic Haplustalfs

### Typical Pedon

Bignell cobbly loam, in an area of Bignell, stony-Yreka, very stony, complex, 15 to 35 percent slopes; in a forested area, 450 feet south and 950 feet west of the northeast corner of sec. 36, T. 9 N., R. 3 W.

Oi—3 inches to 0; undecomposed and slightly decomposed forest litter.

E—0 to 5 inches; grayish brown (10YR 5/2) cobbly loam, dark gray (10YR 4/1) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium and coarse roots; common very fine and fine pores; 15 percent cobbles and 15 percent pebbles; moderately acid (5.8 pH); clear smooth boundary.

Bt/E—5 to 12 inches; brown (10YR 5/3) very cobbly loam, grayish brown (10YR 5/2) moist (Bt part, 60 percent); grayish brown (10YR 5/2) very cobbly loam, gray (10YR 5/1) moist (E part, 40 percent); moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, moderately sticky and slightly plastic; many very fine and fine roots and few medium and coarse roots; common very fine and fine pores;

common distinct clay films on faces of peds in the Bt part; 30 percent cobbles and 15 percent pebbles; slightly acid (pH 6.5); clear wavy boundary.

Bt1—12 to 25 inches; yellowish brown (10YR 5/4) very cobbly clay, brown (10YR 5/3) moist; strong medium prismatic structure parting to strong fine and medium angular blocky; hard, firm, very sticky and moderately plastic; common very fine and fine roots and few medium and coarse roots; common very fine and fine pores; many distinct clay films on faces of peds, common distinct clay films on rock fragments; 35 percent cobbles and stones and 10 percent pebbles; moderately acid (pH 6.0); clear wavy boundary.

Bt2—25 to 60 inches; yellowish brown (10YR 5/4) very cobbly clay loam, brown (10YR 5/3) moist; strong fine and medium angular blocky structure; hard, firm, moderately sticky and moderately plastic; few very fine, fine, medium, and coarse roots; few very fine and fine pores; many distinct clay films on faces of peds, common distinct clay films on surface of rock fragments; 30 percent cobbles and stones, 20 percent pebbles; moderately acid (pH 5.6).

### Range in Characteristics

*Soil temperature:* 40 to 44 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Percent of surface covered by stones:* 0 to 0.1 percent

#### *E horizon:*

Value—5 or 6 dry; 4 or 5 moist

Chroma—1, 2, or 3

Clay content—18 to 27 percent

Content of rock fragments—15 to 35 percent (5 to 20 percent cobbles, 10 to 15 percent pebbles)

Reaction—pH 5.1 to 7.3

#### *Bt/E horizon:*

Value—5 or 6 dry (Bt part); 5, 6, or 7 dry, 5 or 6 moist (E part)

Chroma—2, 3, 4, or 6 (Bt part); 1, 2, or 3 (E part)

Texture—loam or clay loam

Clay content—18 to 40 percent

Content of rock fragments—35 to 60 percent (15 to 35 percent cobbles, 15 to 30 percent pebbles)

Reaction—pH 5.1 to 7.3

#### *Bt horizon:*

Value—5 or 6 dry; 4, 5, or 6 moist

Chroma—3, 4, or 6

Texture—clay, sandy clay, or clay loam

Clay content—35 to 45 percent

Content of rock fragments—35 to 60 percent (20 to 40 percent cobbles, 15 to 25 percent pebbles)

Reaction—pH 5.1 to 6.5

## Blaincreek Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, ridges, and side slopes of hills

*Parent material:* Local alluvium, colluvium, and residuum derived from fine grained igneous rock

*Slope range:* 4 to 70 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Argiustolls

### Typical Pedon

Blaincreek cobbly loam, in an area of Tolbert, very stony-Rock outcrop-Blaincreek, very stony, complex, 35 to 60 percent slopes, in rangeland, 1,550 feet north and 1,000 feet east of the southwest corner of sec. 18, T. 3 N., R. 4 W.

A—0 to 7 inches; dark grayish brown (10YR 4/2) cobbly loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; 15 percent cobbles and 15 percent angular pebbles; neutral (pH 6.6); clear wavy boundary.

Bt1—7 to 13 inches; brown (10YR 4/3) very gravelly loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium and fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; common distinct clay films on faces of peds and on surfaces of rock fragments; 10 percent cobbles and 30 percent angular pebbles; neutral (pH 6.8); gradual wavy boundary.

Bt2—13 to 17 inches; brown (10YR 5/3) very cobbly loam, dark brown (10YR 4/3) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine

tubular and interstitial pores; common faint clay films on faces of pedis and on surfaces of rock fragments; 25 percent cobbles and 20 percent angular pebbles; neutral (pH 7.2); gradual wavy boundary.

BC—17 to 25 inches; grayish brown (10YR 5/2) very cobbly loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; common very fine roots; common very fine and fine pores; 25 percent cobbles and 25 percent angular pebbles; slightly alkaline (pH 7.4); clear smooth boundary.

R—25 inches; hard, brown (10YR 4/3), fractured fine grained igneous bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 15 inches

*Depth to Bt horizon:* 6 to 12 inches

*Depth to bedrock:* 20 to 40 inches

*Percent of surface covered by stones:* 0 to 3 percent

#### A horizon:

Value—4 or 5 dry; 2 or 3 moist

Chroma—2 or 3

Clay content—15 to 27 percent

Content of rock fragments—15 to 40 percent (0 to 15 percent cobbles, 15 to 25 percent angular pebbles)

Reaction—pH 6.1 to 7.3

#### Bt horizon:

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 2, 3, or 4 moist

Chroma—2, 3, or 4

Texture—loam or clay loam

Clay content—25 to 35 percent

Content of rock fragments—30 to 60 percent (5 to 30 percent angular cobbles, 20 to 40 percent angular pebbles)

Reaction—pH 6.1 to 7.8

#### BC horizon:

Hue—10YR or 2.5Y

Value—5 or 6 dry; 2, 3, or 4 moist

Chroma—2, 3, or 4

Texture—loam or clay loam

Clay content—20 to 35 percent

Content of rock fragments—35 to 70 percent (15 to 40 percent angular cobbles, 20 to 40 percent angular pebbles)

Reaction—pH 6.1 to 7.8

## Bobowic Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Ridges and side slopes of mountains

*Parent material:* Local colluvium, slope alluvium, and residuum derived from granite

*Slope range:* 4 to 70 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 40 to 70 days

**Taxonomic classification:** Coarse-loamy, mixed, superactive Ustic Entrocrypts

### Typical Pedon

Bobowic gravelly coarse sandy loam, in an area of Bobowic, very bouldery-Rock outcrop-Tepecreek, very bouldery, complex, 25 to 60 percent slopes; in a forested area, 2,500 feet north and 300 feet west of the southeast corner of sec. 4, T. 1 N., R. 6 W.

Oi—1 inch to 0; forest litter of partially decomposed needles, twigs, and leaves.

A—0 to 3 inches; dark grayish brown (10YR 4/2) gravelly coarse sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and few fine roots; 20 percent pebbles; neutral (pH 7.0); clear smooth boundary.

E—3 to 11 inches; light brownish gray (10YR 6/2) gravelly coarse sandy loam, dark grayish brown (10YR 4/2) moist; moderate thick platy structure parting to weak fine angular blocky; soft, very friable, slightly sticky and nonplastic; many very fine roots and few fine and medium roots; many very fine and few fine pores; 25 percent pebbles; neutral (pH 7.0); clear wavy boundary.

Bw—11 to 21 inches; brown (10YR 5/3) gravelly coarse sandy loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; many very fine roots and few fine and medium roots; many very fine and few fine pores; 25 percent pebbles; neutral (pH 7.0); clear wavy boundary.

Cr—21 to 34 inches; light brownish gray (10YR 6/2), decomposed granite bedrock (grus) that crushes to gravelly loamy coarse sand.

R—34 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches or between a depth of 8 inches and bedrock (if it occurs at a depth of less than 24 inches)

*Depth to Cr horizon:* 20 to 38 inches

*Depth to R layer:* 23 to 40 inches

*Percent of surface covered by stones/boulders:* 0.1 to 3.0 percent

#### *A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 2, 3, or 4 moist

Chroma—1, 2, or 3

Texture—coarse sandy loam or sandy loam

Clay content—10 to 20 percent

Content of rock fragments—10 to 35 percent (0 to 5 percent cobbles, 10 to 30 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *E horizon:*

Hue—10YR or 2.5Y

Value—6 or 7 dry; 4 or 5 moist

Chroma—2 or 3

Texture—coarse sandy loam or sandy loam

Clay content—10 to 18 percent

Content of rock fragments—5 to 35 percent (0 to 15 percent cobbles, 15 to 35 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *Bw horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—coarse sandy loam or sandy loam

Clay content—10 to 18 percent

Content of rock fragments—10 to 35 percent pebbles

Reaction—pH 6.1 to 7.3

### Bondoe Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderately slow (0.2 to 0.6 inch per hour)

*Landform:* Alluvial fans

*Parent material:* Alluvium and colluvium derived mainly from hard shale

*Slope range:* 4 to 15 percent

*Elevation range:* 4,000 to 4,800 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Aridic Haplustalfs

### Typical Pedon

Bondoe channery loam, 4 to 15 percent slopes, in rangeland, 1,600 feet south and 1,750 feet east of the northwest corner of sec. 36, T. 2 N., R. 3 W.

A—0 to 4 inches; light brownish gray (2.5Y 6/2) channery loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and few fine roots; 20 percent channers; neutral (pH 7.2); clear wavy boundary.

Bt—4 to 11 inches; grayish brown (2.5Y 5/2) channery clay loam, dark grayish brown (2.5Y 4/2) moist; strong medium prismatic structure; hard, friable, moderately sticky and slightly plastic; many very fine and few fine roots; many very fine pores; common faint clay films on faces of peds; 20 percent channers; neutral (pH 7.2); clear wavy boundary.

Bk—11 to 23 inches; grayish brown (2.5Y 5/2) very channery loam, dark grayish brown (2.5Y 4/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine pores; 40 percent channers; disseminated lime, continuous distinct lime coatings on coarse fragments; strongly effervescent; slightly alkaline (pH 7.4); gradual irregular boundary.

C—23 to 60 inches; gray (10YR 5/1) very channery loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine pores; 55 percent channers; slightly effervescent; slightly alkaline (pH 7.6).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bt horizon:* 3 to 7 inches

*Depth to Bk horizon:* 10 to 18 inches

#### *A horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry

Chroma—2 or 3

Clay content—18 to 25 percent

Content of rock fragments—15 to 30 percent shale channers

Reaction—pH 6.6 to 7.3

**Bt horizon:**

Hue—10YR or 2.5Y  
 Value—4 or 5  
 Chroma—2 or 3  
 Texture—loam or clay loam  
 Clay content—25 to 35 percent  
 Content of rock fragments—15 to 35 percent  
 shale channers  
 Reaction—pH 6.6 to 7.8

**Bk horizon:**

Hue—10YR or 2.5Y  
 Value—5 or 6 dry; 4 or 5 moist  
 Chroma—2, 3, or 4  
 Texture—loam or silt loam  
 Clay content—18 to 27 percent  
 Content of rock fragments—35 to 60 percent  
 shale channers  
 Calcium carbonate equivalent—5 to 15 percent  
 Reaction—pH 7.4 to 8.4

**C horizon:**

Hue—10YR or 2.5Y  
 Value—5 or 6 dry; 4 or 5 moist  
 Chroma—1, 2, or 3  
 Texture—loam or silt loam  
 Clay content—18 to 27 percent  
 Content of rock fragments—35 to 60 percent  
 shale channers  
 Calcium carbonate equivalent—3 to 10 percent  
 Reaction—pH 7.4 to 8.4

**Bonebasin Series**

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Very poorly drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour) above the 2C horizon and rapid (6.0 to 20.0 inches per hour) in the 2C horizon

*Landform:* Flood plains and drainageways

*Parent material:* Recent alluvium derived from mixed rock sources

*Slope range:* 0 to 2 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Fluvaquentic Endoaquolls

**Typical Pedon**

Bonebasin loam, in an area of Clunton-Wetsand-

Bonebasin complex, 0 to 2 percent slopes, in pasture, 1,200 feet south and 1,500 feet west of the northeast corner of sec. 4, T. 5 N., R. 4 W.

Oe—2 inches to 0; very dark grayish brown (10YR 3/2) mucky peat, black (10YR 2/1) moist; neutral (pH 6.8); clear smooth boundary.

A—0 to 6 inches; dark gray (10YR 4/1) loam, very dark gray (10YR 3/1) moist; many faint yellowish red (5YR 5/6) redox concentrations; moderate medium subangular blocky structure; slightly hard, firm, moderately sticky and slightly plastic; many very fine and fine roots; common very fine and fine pores; neutral (pH 6.8); clear smooth boundary.

Ag—6 to 13 inches; grayish brown (2.5Y 5/2) loam, very dark grayish brown (2.5Y 3/2) moist; many distinct yellowish red (5YR 5/6) redox concentrations; common faint very dark gray (5Y 3/1) redox depletions; moderate medium subangular blocky structure; slightly hard, very friable, moderately sticky and slightly plastic; many very fine roots; many very fine and fine pores; neutral (pH 6.7); clear smooth boundary.

Cg1—13 to 19 inches; brown (7.5YR 5/2) gravelly sandy loam, dark brown (7.5YR 4/2) moist; common distinct strong brown (7.5YR 5/6) redox concentrations; common faint very dark gray (5Y 3/1) redox depletions; massive; slightly hard, very friable, slightly sticky and nonplastic; many very fine roots; common very fine and fine pores; 25 percent pebbles; neutral (pH 6.6); clear smooth boundary.

Cg2—19 to 23 inches; grayish brown (10YR 5/2) loam, dark brown (10YR 3/3) moist; many distinct very dark gray (5Y 3/1) redox depletions; few faint yellowish red (5YR 5/6) redox concentrations; massive; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine and fine pores; 5 percent pebbles; neutral (pH 6.7); clear smooth boundary.

2C—23 to 60 inches; brown (7.5YR 5/2) extremely gravelly loamy sand and sand, dark brown (7.5YR 4/2) moist; common distinct yellowish red (5YR 5/6) redox concentrations; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; 15 percent cobbles and 50 percent pebbles; neutral (pH 6.8).

**Range in Characteristics**

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 10 to 15 inches

*Water table:* At the surface to 12 inches below the surface for extended periods during spring and summer

*Depth to 2C horizon:* 20 to 40 inches

*A horizons:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 2 or 3 moist

Chroma—1 or 2

Clay content—18 to 27 percent

Content of rock fragments—0 to 5 percent pebbles

Reaction—pH 6.6 to 7.3

*Cg horizon:*

Hue—10YR, 7.5YR, 2.5Y, or 5Y

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—1, 2, or 3

Texture—loam or silt loam or strata of sandy loam, clay loam, or sand and gravel

Clay content—18 to 27 percent

Content of rock fragments—5 to 25 percent pebbles

Reaction—pH 6.6 to 7.8

*2C horizon:*

Hue—7.5YR, 10YR, 2.5Y, or 5Y

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—1 or 2

Texture—loamy sand, loamy coarse sand, or sand

Clay content—0 to 10 percent

Content of rock fragments—35 to 70 percent (10 to 20 percent cobbles, 25 to 50 percent pebbles)

Reaction—pH 6.1 to 7.3

## Branham Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Ridges and side slopes of mountains

*Parent material:* Local colluvium, slope alluvium, and residuum derived from granite

*Slope range:* 0 to 70 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Coarse-loamy, mixed, superactive Ustic Haplocryolls

### Typical Pedon

Branham sandy loam, in an area of Branham-Opitz-

Tuggle complex, 2 to 15 percent slopes, in rangeland, 1,300 feet west and 50 feet south of the northeast corner of sec. 17, T. 1 S., R. 6 W.

A—0 to 8 inches; very dark gray (10YR 3/1) sandy loam, black (10YR 2/1) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; 10 percent granite pebbles; slightly acid (pH 6.2); clear wavy boundary.

Bw1—8 to 12 inches; brown (10YR 4/3) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; many very fine pores; 10 percent granite pebbles; neutral (pH 6.6); clear wavy boundary.

Bw2—12 to 16 inches; brown (10YR 5/3) gravelly coarse sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; many fine and very fine pores; 25 percent granite pebbles; neutral (pH 6.8); gradual smooth boundary.

BC—16 to 30 inches; yellowish brown (10YR 5/6) gravelly loamy coarse sand; single grain; loose, nonsticky and nonplastic; few very fine roots; 30 percent granite pebbles; neutral (pH 6.8); gradual wavy boundary.

Cr—30 to 36 inches; yellowish brown (10YR 5/6), decomposing granite bedrock (grus) that textures to very gravelly loamy coarse sand.

R—36 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches

*Thickness of the mollic epipedon:* 7 to 12 inches

*Depth to Cr horizon:* 20 to 38 inches

*Depth to R layer:* 23 to 40 inches

*Percent of surface covered by stones/boulders:* 0 to 3 percent

*A horizon:*

Value—3 or 4 dry; 2 or 3 moist

Chroma—1 or 2

Texture—coarse sandy loam, sandy loam, or loam

Clay content—8 to 27 percent

Content of rock fragments—5 to 35 percent (0 to 15 percent cobbles, 5 to 20 percent pebbles)

Reaction—pH 5.6 to 7.3

*Bw horizon:*

Value—4 or 5 dry; 3 or 4 moist

Chroma—2, 3, or 4

Texture—coarse sandy loam or sandy loam  
 Clay content—10 to 18 percent  
 Content of rock fragments—10 to 35 percent (0 to 10 percent cobbles, 10 to 25 percent pebbles)  
 Reaction—pH 6.1 to 7.8

**BC horizon:**

Value—5, 6, or 7 dry; 4, 5, or 6 moist  
 Chroma—2, 3, 4, or 6  
 Texture—coarse sand or loamy coarse sand  
 Clay content—4 to 10 percent  
 Content of rock fragments—15 to 35 percent (0 to 5 percent cobbles, 15 to 30 percent pebbles)  
 Reaction—pH 6.1 to 7.8

**Breeton Series**

*Depth class:* Very deep (greater than 60 inches)  
*Drainage class:* Well drained  
*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)  
*Landform:* Alluvial fans, stream terraces, and side slopes of hills  
*Parent material:* Alluvium or colluvium derived from granite  
*Slope range:* 1 to 45 percent  
*Elevation range:* 4,400 to 6,000 feet  
*Annual precipitation:* 15 to 19 inches  
*Annual air temperature:* 36 to 40 degrees F  
*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Coarse-loamy, mixed, superactive, frigid Pachic Haplustolls

**Typical Pedon**

Breeton gravelly loam, 2 to 8 percent slopes, in rangeland, 1,900 feet north and 2,500 feet east of the southwest corner of sec. 28, T. 8 N., R. 4 W.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) gravelly loam, black (10YR 2/1) moist; moderate medium granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; 15 percent granite pebbles; neutral (pH 6.6); clear wavy boundary.

A2—4 to 12 inches; very dark gray (10YR 3/1) gravelly loam, black (10YR 2/1) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine and fine pores; 15 percent granite pebbles; neutral (pH 7.0); gradual wavy boundary.

Bw—12 to 26 inches; dark grayish brown (10YR 4/2) gravelly coarse sandy loam, dark brown (10YR 3/3) moist; moderate coarse prismatic structure

parting to weak medium subangular blocky; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine pores; 20 percent granite pebbles; slightly alkaline (pH 7.4); gradual irregular boundary.

BC—26 to 60 inches; brown (10YR 5/3) gravelly coarse sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; 25 percent granite pebbles; slightly alkaline (pH 7.6).

**Range in Characteristics**

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches

*Thickness of the mollic epipedon:* 16 to 28 inches

*Percent of surface covered by boulders:* 0 to 0.1 percent

**A horizon:**

Hue—10YR or 2.5Y  
 Value—3 or 4 dry; 2 or 3 moist  
 Chroma—1 or 2  
 Texture—loam, coarse sandy loam, or sandy loam  
 Clay content—8 to 25 percent  
 Content of rock fragments—0 to 15 percent pebbles  
 Reaction—pH 6.1 to 7.3

**Bw horizon:**

Hue—10YR or 2.5Y  
 Value—4, 5, or 6 dry; 3, 4, or 5 moist  
 Chroma—2 or 3  
 Texture—sandy loam, coarse sandy loam, or loam  
 Clay content—8 to 18 percent  
 Content of rock fragments—5 to 30 percent pebbles  
 Reaction—pH 6.1 to 7.8

**BC horizon:**

Hue—10YR or 2.5Y  
 Value—5 or 6 dry; 4 or 5 moist  
 Chroma—2 or 3  
 Texture—coarse sandy loam, loamy coarse sand, or sandy loam  
 Clay content—5 to 15 percent  
 Content of rock fragments—10 to 30 percent pebbles  
 Reaction—pH 6.1 to 7.8

**Brickner Series**

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, ridges, and side slopes of hills

*Parent material:* Residuum derived from hard, fine grained sandstone or igneous rock

*Slope range:* 4 to 70 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Lithic Haplustalfs

### Typical Pedon

Brickner gravelly sandy clay loam, stony, in an area of Brickner, stony-Whitlash, very stony-Rock outcrop complex, 35 to 60 percent slopes; in a forested area, 2,550 feet north and 875 feet east of the southwest corner of sec. 13, T. 1 N., R. 2 W.

Oi— $\frac{1}{2}$  inch to 0; forest litter of partially decomposed needles, twigs, and leaves.

A—0 to 3 inches; brown (10YR 4/3) gravelly sandy clay loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; 25 percent angular pebbles; neutral (pH 6.6); clear wavy boundary.

Bt—3 to 8 inches; dark yellowish brown (10YR 4/4) very gravelly sandy clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine and few medium roots; common very fine and fine pores; common faint brown (10YR 4/3) clay films on faces of peds and bridging sand grains; 5 percent angular cobbles and 35 percent angular pebbles; moderately acid (pH 6.0); clear wavy boundary.

BC—8 to 12 inches; yellowish brown (10YR 5/4) extremely gravelly coarse sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; common very fine and fine roots and few medium roots; 15 percent angular cobbles and 55 percent angular pebbles; moderately acid (pH 6.0); clear smooth boundary.

R—12 inches; hard, fractured fine grained sandstone.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and

12 inches or between a depth of 4 inches and the lithic contact (if it occurs at a depth of less than 12 inches)

*Depth to Bt horizon:* 3 to 5 inches

*Depth to bedrock:* 10 to 20 inches

*Percent of surface covered by stones/boulders:* 0 to 3 percent

*A horizon:*

Value—4 or 5 dry; 3 or 4 moist

Chroma—2 or 3

Texture—loamy coarse sand, loam, or sandy clay loam

Clay content—10 to 25 percent

Content of rock fragments—15 to 50 percent (0 to 15 percent cobbles, 15 to 30 percent pebbles)

Reaction—pH 6.1 to 7.3

*Bt horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 3 or 4 moist

Chroma—2, 3, or 4

Clay content—20 to 30 percent

Content of rock fragments—35 to 60 percent (0 to 10 percent cobbles, 35 to 50 percent pebbles)

Reaction—pH 5.6 to 7.3

*BC horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—sandy loam, coarse sandy loam, or sandy clay loam

Clay content—12 to 25 percent

Content of rock fragments—45 to 70 percent (0 to 5 percent stones, 0 to 15 percent cobbles, and 45 to 60 percent pebbles)

Reaction—pH 5.6 to 7.3

### Brocko Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, ridges, and side slopes of hills

*Parent material:* Alluvium and eolian material

*Slope range:* 0 to 35 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Coarse-silty, mixed, superactive, frigid Aridic Calcustepts

### Typical Pedon

Brocko silt loam, 2 to 8 percent slopes, in cropland, 300 feet west and 2,640 feet north of the southeast corner of sec. 36, T. 3 N., R. 1 W.

- Ap—0 to 5 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; common very fine roots; disseminated lime; strongly effervescent; moderately alkaline (pH 8.2); abrupt smooth boundary.
- Bk1—5 to 12 inches; light gray (10YR 7/2) silt loam, brown (10YR 5/3) moist; weak medium prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; many fine and very fine pores; disseminated lime, common fine seams and masses of lime; violently effervescent; moderately alkaline (pH 8.4); gradual smooth boundary.
- Bk2—12 to 24 inches; light gray (10YR 7/2) silt loam, brown (10YR 5/3) moist; weak coarse prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; many fine and very fine pores; disseminated lime, common fine seams and masses of lime; violently effervescent; strongly alkaline (pH 8.6); clear wavy boundary.
- Bk3—24 to 60 inches; white (10YR 8/2) silt loam, light brownish gray (10YR 6/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; disseminated lime, few fine threads and masses of lime; strongly effervescent; strongly alkaline (pH 8.6).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to calcic horizon:* 5 to 8 inches

#### *Ap horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2 or 3

Clay content—10 to 18 percent

Calcium carbonate equivalent—5 to 10 percent

Reaction—pH 7.4 to 8.4

#### *Bk horizon:*

Hue—10YR or 2.5Y

Value—6, 7, or 8 dry; 4, 5, or 6 moist

Chroma—2 or 3

Texture—silt loam or very fine sandy loam

Clay content—10 to 18 percent

Electrical conductivity—2 to 8 mmhos/cm

Sodium adsorption ratio—0 to 13

Calcium carbonate equivalent—15 to 35 percent

Reaction—pH 7.9 to 9.0

### Bronec Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, sides of hills, escarpments, and valley floors

*Parent material:* Alluvium, colluvium, and Tertiary valley fill material

*Slope range:* 0 to 70 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Aridic Calcustepts

### Typical Pedon

Bronec gravelly loam, in an area of Bronec-Amesha complex, 2 to 8 percent slopes, in rangeland, 2,390 feet east and 2,160 feet north of the southwest corner of sec. 4, T. 2 N., R. 4 W.

A—0 to 2 inches; grayish brown (10YR 5/2) gravelly loam, dark brown (10YR 3/3) moist; weak medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; 15 percent pebbles; disseminated lime; slightly effervescent; slightly alkaline (pH 7.6); clear wavy boundary.

Bk1—2 to 9 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; many fine and very fine pores; 25 percent pebbles; disseminated lime, few fine masses and threads of lime, common faint lime coatings on undersides of pebbles; strongly effervescent; moderately alkaline (pH 8.0); clear wavy boundary.

Bk2—9 to 21 inches; very pale brown (10YR 7/3) gravelly loam, pale brown (10YR 6/3) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; hard, friable, moderately sticky and slightly plastic; few fine and very fine roots; common fine and very fine pores; 30 percent pebbles; disseminated lime, common fine masses and threads of lime, common distinct

lime coatings on pebbles; violently effervescent; moderately alkaline (pH 8.4); clear wavy boundary.

**Bk3**—21 to 35 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 5/3) moist; weak coarse prismatic structure; slightly hard, very friable, slightly sticky and nonplastic; few very fine roots; common very fine pores; 45 percent pebbles; disseminated lime, common fine masses and threads of lime, common distinct lime coatings on undersides of pebbles; violently effervescent; moderately alkaline (pH 8.4); clear wavy boundary.

**Bk4**—35 to 48 inches; pale brown (10YR 6/3) very gravelly sandy loam, yellowish brown (10YR 5/4) moist; weak coarse prismatic structure; slightly hard, very friable, nonsticky and nonplastic; 45 percent pebbles; disseminated lime, few faint lime coatings on undersides of pebbles; violently effervescent; moderately alkaline (pH 8.2); gradual wavy boundary.

**BC**—48 to 60 inches; brown (10YR 5/3) very gravelly loamy sand, dark brown (10YR 3/3) moist; single grain; loose, nonsticky and nonplastic; 40 percent pebbles; few faint lime coatings on undersides of pebbles; strongly effervescent; moderately alkaline (pH 8.0).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bk horizon:* 2 to 6 inches

*Percent of surface covered by stones:* 0 to 3 percent

#### *A horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 3 or 4 moist

Chroma—2, 3, or 4

Texture—loam or fine sandy loam

Clay content—5 to 25 percent

Content of rock fragments—10 to 60 percent (0 to 20 percent cobbles and stones, 10 to 40 percent pebbles)

Reaction—pH 6.6 to 8.4; pH 8.5 to 9.6 in the saline phase

Electrical conductivity—8 to 16 mmhos/cm (saline phase)

Sodium adsorption ratio—13 to 30 (saline phase)

#### *Bk1 horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Clay content—15 to 27 percent

Content of rock fragments—15 to 60 percent (0 to 10 percent cobbles and stones, 15 to 50 percent pebbles)

Calcium carbonate equivalent—3 to 15 percent

Electrical conductivity—0 to 4 mmhos/cm; 16 to 30 mmhos/cm in the saline phase

Sodium adsorption ratio—13 to 30 (saline phase)

Reaction—pH 7.4 to 8.4; pH 8.5 to 9.6 in the saline phase

#### *Bk2 horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—loam or sandy loam

Clay content—15 to 27 percent

Content of rock fragments—20 to 60 percent (0 to 20 percent cobbles and stones, 20 to 50 percent pebbles)

Calcium carbonate equivalent—15 to 40 percent

Electrical conductivity—0 to 4 mmhos/cm; 4 to 25 mmhos/cm in the saline phase

Reaction—pH 7.9 to 9.0; pH 8.5 to 9.6 in the saline phase

#### *Bk3 and Bk4 horizons:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—loam or sandy loam

Clay content—15 to 25 percent

Content of rock fragments—35 to 60 percent (0 to 25 percent cobbles and stones, 25 to 50 percent pebbles)

Calcium carbonate equivalent—5 to 25 percent

Electrical conductivity—0 to 4 mmhos/cm; 4 to 25 mmhos/cm in the saline phase

Sodium adsorption ratio—4 to 20 (saline phase)

Reaction—pH 7.4 to 8.4; pH 8.4 to 9.6 in the saline phase

#### *BC horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 3, 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—sandy loam, coarse sandy loam, or loamy sand

Clay content—10 to 20 percent

Content of rock fragments—35 to 70 percent (0 to 25 percent cobbles and stones, 25 to 60 percent pebbles)

Calcium carbonate equivalent—3 to 25 percent

Reaction—pH 7.4 to 8.4; pH 8.5 to 9.6 in the saline phase

Electrical conductivity—4 to 25 mmhos/cm (saline phase)

Sodium adsorption ratio—4 to 20 (saline phase)

## Burtoner Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Ridges, escarpments, and side slopes of hills

*Parent material:* Local colluvium, alluvium, and residuum derived from granite

*Slope range:* 2 to 60 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Typic Argiustolls

### Typical Pedon

Burtoner sandy clay loam, in an area of Burtoner-Connieo, bouldery-Rock outcrop complex, 4 to 15 percent slopes, in rangeland, 2,400 feet north and 100 feet west of the southeast corner of sec. 11, T. 5 N., R. 4 W.

A—0 to 8 inches; grayish brown (10YR 5/2) sandy clay loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and few fine roots; many very fine and fine and few medium pores; 10 percent granite pebbles; neutral (pH 7.2); clear smooth boundary.

Bt1—8 to 14 inches; yellowish brown (10YR 5/4) sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium prismatic structure parting to moderate medium and fine subangular blocky; slightly hard, friable, moderately sticky and slightly plastic; many very fine and few fine roots; many very fine and few fine pores; many faint clay films bridging sand grains and common faint clay films on faces of peds; 10 percent granite pebbles; slightly alkaline (pH 7.5); clear wavy boundary.

Bt2—14 to 23 inches; yellowish brown (10YR 5/4) sandy clay loam, brown (10YR 4/3) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and few fine roots; many very fine and few fine pores; many faint clay films bridging sand grains and common faint clay films on faces of peds; 10 percent granite pebbles; neutral (pH 7.3); clear wavy boundary.

Cr—23 to 28 inches; light brownish gray (2.5Y 6/2), decomposed granite bedrock (grus) that crushes to very gravelly loamy coarse sand.

R—28 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bt horizon:* 7 to 15 inches

*Depth to Cr horizon:* 20 to 38 inches

*Depth to R layer:* 23 to 40 inches

*Percent of surface covered by stones/boulders:* 0 to 15 percent

*A horizon:*

Hue—10YR or 2.5Y

Value—3, 4, or 5 dry; 2 or 3 moist

Chroma—1, 2, or 3

Texture—loam, coarse sandy loam, sandy loam, or sandy clay loam

Clay content—10 to 25 percent

Content of rock fragments—0 to 60 percent (0 to 20 percent cobbles and stones, 0 to 40 percent pebbles)

Reaction—pH 6.1 to 7.3

*Bt horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 3 or 4 moist

Chroma—2, 3, or 4

Texture—sandy clay loam or clay loam

Clay content—20 to 30 percent

Content of rock fragments—5 to 35 percent pebbles

Reaction—pH 6.6 to 7.8

## Cabbart Series

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, knolls, and hills

*Parent material:* Alluvium and residuum derived from semiconsolidated loamy sedimentary beds

*Slope range:* 2 to 60 percent

*Elevation range:* 4,200 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Loamy, mixed, superactive, calcareous, frigid, shallow Aridic Ustorthents

### Typical Pedon

Cabbart loam, in an area of Cabbart-Shoddy-Amesha complex, 8 to 15 percent slopes, in rangeland, 1,100 feet south and 375 feet west of the northeast corner of sec. 35, T. 3 N., R. 1 W.

A—0 to 5 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; 5 percent rounded pebbles; disseminated lime; slightly effervescent; moderately alkaline (pH 8.2); clear wavy boundary.

Bk1—5 to 9 inches; light gray (10YR 7/2) loam, pale brown (10YR 6/3) moist; weak medium prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; 5 percent rounded pebbles; disseminated lime, common fine threads and masses of lime, common faint lime coatings on pebbles; strongly effervescent; strongly alkaline (pH 8.6); clear wavy boundary.

Bk2—9 to 18 inches; light gray (10YR 7/2) fine sandy loam, light brownish gray (10YR 6/2) moist; weak coarse prismatic structure; hard, very friable, slightly sticky and slightly plastic; common very fine roots and pores; 5 percent rounded pebbles; disseminated lime, common fine threads and masses of lime, common faint lime coatings on pebbles; strongly effervescent; moderately alkaline (pH 8.4); clear wavy boundary.

Cr—18 to 60 inches; light gray (10YR 7/2), semiconsolidated loamy sedimentary beds that crush to loam, fine sandy loam, and/or very fine sandy loam.

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the paralithic contact (if it occurs at a depth of less than 12 inches)

*Depth to Cr horizon:* 10 to 20 inches

*Percent of surface covered by stones:* 0 to 3 percent

*A horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 3, 4, or 5 moist

Chroma—2, 3, or 4

Texture—loam or clay loam

Clay content—15 to 32 percent

Content of rock fragments—0 to 50 percent (0 to 20 percent hard cobbles, 0 to 30 percent hard pebbles)

Calcium carbonate equivalent—5 to 10 percent

Reaction—pH 7.4 to 9.0

*Bk horizon:*

Hue—10YR or 2.5Y

Value—5, 6, 7, or 8 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—loam, clay loam, silt loam, or fine sandy loam

Clay content—18 to 35 percent

Content of rock fragments—0 to 25 percent (0 to 15 percent hard pebbles, 0 to 10 percent soft pebbles)

Calcium carbonate equivalent—5 to 25 percent

Reaction—pH 7.4 to 9.0

### Cardwell Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Somewhat poorly drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour) above the 2C horizon and rapid (6.0 to 20.0 inches per hour) in the 2C horizon

*Landform:* Flood plains and flood-plain steps

*Parent material:* Recent alluvium derived from mixed rock sources

*Slope range:* 0 to 2 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine-silty over sandy or sandy-skeletal, mixed, superactive, frigid Oxyaquic Haplustolls

### Typical Pedon

Cardwell silty clay loam, in an area of Riverrun-Cardwell complex, 0 to 2 percent slopes, in pasture, 60 feet east and 230 feet south of the northwest corner of sec. 15, T. 1 N., R. 4 W.

A1—0 to 6 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; hard, firm, moderately sticky and moderately plastic; many very fine and common fine roots; many very fine and common fine pores; disseminated lime; strongly effervescent; moderately alkaline (pH 8.2); clear smooth boundary.

A2—6 to 14 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, firm, moderately sticky and moderately plastic; common very fine and few fine roots; many very fine and

few fine pores; disseminated lime; strongly effervescent; moderately alkaline (pH 8.2); clear smooth boundary.

Bw—14 to 28 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; common fine distinct strong brown (7.5YR 4/6) redox concentrations; weak medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few very fine and fine roots; many very fine and few fine pores; disseminated lime; violently effervescent; moderately alkaline (pH 8.4); abrupt smooth boundary.

2C1—28 to 36 inches; light brownish gray (10YR 6/2) very gravelly loamy sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; 45 percent pebbles; disseminated lime, common faint lime coatings on undersides of fragments; slightly effervescent; moderately alkaline (pH 8.2); gradual smooth boundary.

2C2—36 to 60 inches; pale brown (10YR 6/3) very gravelly loamy sand, brown (10YR 4/3) moist; single grain; loose, nonsticky and nonplastic; 50 percent pebbles; moderately alkaline (pH 8.0).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 10 to 15 inches

*Depth to 2C horizon:* 20 to 40 inches

*Depth to the water table:* 24 to 42 inches for extended periods during spring and early summer

#### *A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 2 or 3 moist

Chroma—2 or 3

Texture—silty clay loam, loam, or sandy loam

Clay content—10 to 35 percent

Content of rock fragments—0 to 15 percent pebbles

Calcium carbonate equivalent—0 to 10 percent

Reaction—pH 7.4 to 8.4

Electrical conductivity—4 to 16 mmhos/cm (saline phase)

Sodium adsorption ratio—0 to 4 (saline phase)

#### *Bw horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2 or 3

Texture—loam or silt loam

Clay content—18 to 27 percent

Content of rock fragments—0 to 15 percent pebbles

Calcium carbonate equivalent—0 to 10 percent

Reaction—pH 7.4 to 8.4

Electrical conductivity—4 to 16 mmhos/cm (saline phase)

Sodium adsorption ratio—0 to 8 (saline phase)

#### *2C horizon:*

Hue—10YR, 2.5Y, or 5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—loamy sand or sand or strata of fine sandy loam, loam, or very fine sandy loam

Clay content—0 to 10 percent

Content of rock fragments—35 to 75 percent (0 to 15 percent cobbles, 35 to 60 percent pebbles)

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 6.6 to 8.4

Electrical conductivity—2 to 8 mmhos/cm (saline phase)

## Caseypeak Series

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Well drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Side slopes and ridges of mountains

*Parent material:* Residuum derived from granite

*Slope range:* 2 to 60 percent

*Elevation range:* 5,500 to 8,000 feet

*Annual precipitation:* 15 to 30 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 30 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Lithic Eutrocrypts

### Typical Pedon

Caseypeak gravelly coarse sandy loam, in an area of Caseypeak, very bouldery-Franconi, very bouldery-Rock outcrop complex, 25 to 60 percent slopes; in a forested area, 1,550 feet north and 1,100 feet west of the southeast corner of sec. 19, T. 4 N., R. 3 W.

Oi—1½ inches to 0; forest litter of partially decomposed needles, twigs, and leaves.

E—0 to 5 inches; light brownish gray (10YR 6/2) gravelly coarse sandy loam, brown (10YR 5/3) moist; moderate medium granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine and common

medium roots; 20 percent granite pebbles; slightly acid (pH 6.2); clear wavy boundary.

Bw1—5 to 11 inches; brown (10YR 5/3) very gravelly coarse sandy loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine and common medium roots; many very fine and few fine pores; 40 percent granite pebbles; neutral (pH 6.6); gradual wavy boundary.

Bw2—11 to 16 inches; pale brown (10YR 6/3) very gravelly coarse sandy loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine, common fine, and few medium roots; many very fine and few fine pores; 40 percent granite pebbles; neutral (pH 6.7); clear wavy boundary.

Cr—16 to 19 inches; light yellowish brown (2.5Y 6/4), decomposed granite bedrock (grus) that crushes to very gravelly loamy coarse sand.

R—19 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 36 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Cr horizon:* 10 to 18 inches

*Depth to R layer:* 12 to 20 inches

*Percent of surface covered by stones/boulders:* 0 to 50 percent

#### *E horizon:*

Hue—10YR or 2.5Y

Value—6 or 7 dry; 5 or 6 moist

Chroma—2 or 3

Texture—coarse sandy loam, sandy loam, or loamy coarse sand

Clay content—10 to 20 percent

Content of rock fragments—10 to 60 percent (0 to 15 percent cobbles and stones, 10 to 50 percent pebbles)

Reaction—pH 5.6 to 6.5

#### *Bw horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—3 or 4

Texture—coarse sandy loam, sandy loam, or sandy clay loam

Clay content—10 to 22 percent

Content of rock fragments—35 to 60 percent pebbles

Reaction—pH 6.1 to 7.3

## Castner Series

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Well drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Ridges and the upper side slopes of hills

*Parent material:* Residuum derived from fine grained sandstone or igneous rock

*Slope range:* 25 to 60 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Lithic Haplustolls

### Typical Pedon

Castner very cobbly loam, in an area of Castner, bouldery-Rock outcrop complex, 25 to 50 percent slopes, in rangeland, 350 feet east and 600 feet north of the southwest corner of sec. 21, T. 5 N., R. 2 W.

A—0 to 6 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, nonsticky and nonplastic; many fine roots; 15 percent angular cobbles and 25 percent angular pebbles; slightly alkaline (pH 7.8); gradual wavy boundary.

Bk—6 to 12 inches; grayish brown (10YR 5/2) extremely gravelly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many fine and very fine roots; common very fine and fine pores; 20 percent angular cobbles and 50 percent angular pebbles; disseminated lime, common distinct lime crusts on undersides of some fragments; strongly effervescent; moderately alkaline (pH 8.2); clear smooth boundary.

R—12 inches; hard, massive, fine grained sandstone.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the lithic contact (if it occurs at a depth of less than 12 inches)

*Thickness of the mollic epipedon:* 7 to 12 inches (mixed)

*Depth to Bk horizon:* 6 to 10 inches

*Depth to bedrock:* 10 to 20 inches

*Percent of surface covered by stones/boulders:* 0 to 3 percent

*A horizon:*

Value—3, 4, or 5 dry; 2 or 3 moist

Chroma—2 or 3

Clay content—10 to 25 percent

Content of rock fragments—15 to 55 percent (5 to 25 percent cobbles and stones, 15 to 30 percent pebbles)

Reaction—pH 6.6 to 8.4

*Bk horizon:*

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2 or 3

Texture—loam or sandy loam

Clay content—10 to 18 percent

Content of rock fragments—35 to 80 percent (10 to 25 percent cobbles and stones, 25 to 60 percent pebbles)

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.4 to 8.4

## Catgulch Series

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, ridges, and side slopes of hills

*Parent material:* Residuum derived from granite

*Slope range:* 2 to 70 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Lithic Haplustolls

### Typical Pedon

Catgulch gravelly sandy clay loam, in an area of Crackerville-Catgulch, bouldery-Rock outcrop complex, 8 to 25 percent slopes, in rangeland, 1,800 feet north and 600 feet west of the southeast corner of sec. 33, T. 7 N., R. 4 W.

A—0 to 5 inches; dark grayish brown (10YR 4/2) gravelly sandy clay loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; 20 percent granite pebbles; slightly acid (pH 6.5); clear smooth boundary.

Bw1—5 to 9 inches; brown (10YR 5/3) very gravelly sandy clay loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; common very fine and fine pores; 40 percent granite pebbles; neutral (pH 6.6); clear smooth boundary.

Bw2—9 to 12 inches; brown (10YR 5/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; few very fine and fine roots; common very fine and fine pores; 45 percent pebbles; slightly acid (pH 6.5); abrupt smooth boundary.

Cr—12 to 15 inches; yellowish brown (10YR 5/4), decomposed granite bedrock (grus) that crushes to very gravelly loamy coarse sand.

R—15 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 12 inches

*Depth to Cr horizon:* 10 to 18 inches

*Depth to R layer:* 12 to 20 inches

*Percent of surface covered by stones/boulders:* 0 to 15 percent

*A horizon:*

Hue—10YR or 2.5Y

Value—3 or 4 dry; 2 or 3 moist

Chroma—2 or 3

Texture—sandy loam, sandy clay loam, or coarse sandy loam

Clay content—12 to 24 percent

Content of rock fragments—5 to 50 percent (0 to 20 percent cobbles and stones, 5 to 30 percent pebbles)

Reaction—pH 6.1 to 7.3

*Bw horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 3 or 4 moist

Chroma—3, 4, or 6

Texture—sandy loam, coarse sandy loam, or sandy clay loam

Clay content—10 to 22 percent

Content of rock fragments—35 to 60 percent (5 to 20 percent cobbles and stones, 30 to 40 percent pebbles)

Reaction—pH 6.1 to 7.3

## Cedric Series

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Well drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Ridges and hills

*Parent material:* Residuum derived from granite

*Slope range:* 2 to 35 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 12 to 17 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 95 days

**Taxonomic classification:** Loamy, mixed, superactive, frigid Lithic Argiustolls

### Typical Pedon

Cedric coarse sandy loam, in an area of Cedric, bouldery-Rock outcrop-Jeffcity, bouldery, complex, 2 to 15 percent slopes, in rangeland, 1,100 feet north and 900 feet west of the southeast corner of sec. 18, T. 1 N., R. 5 W.

A—0 to 5 inches; dark grayish brown (10YR 4/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; 10 percent granite pebbles; neutral (pH 6.8); clear wavy boundary.

Bt—5 to 11 inches; brown (10YR 4/3) gravelly coarse sandy loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine and fine pores; common faint dark grayish brown (10YR 4/2) clay films on faces of peds and bridging sand grains; 20 percent granite pebbles; neutral (pH 7.0); clear wavy boundary.

Bk—11 to 15 inches; light brownish gray (10YR 6/2) very gravelly coarse sandy loam, grayish brown (10YR 5/2) moist; moderate coarse prismatic structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; common very fine and fine pores; 40 percent granite pebbles; disseminated lime, common fine masses and threads of lime, common distinct lime coatings on rock fragments; violently effervescent; moderately alkaline (pH 8.2); clear smooth boundary.

Cr—15 to 18 inches; brown (10YR 5/3), partially decomposed granite bedrock (grus) that crushes to very gravelly loamy coarse sand.

R—18 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between a depth of 8 inches and the lithic contact

*Depth to Bk horizon:* 8 to 13 inches

*Depth to Bt horizon:* 5 to 8 inches

*Depth to Cr horizon:* 10 to 17 inches

*Depth to R layer:* 12 to 20 inches

*Percent of surface covered by stones/boulders:* 0 to 0.1 percent

*A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 3 or 4 moist

Chroma—2 or 3

Clay content—5 to 15 percent

Content of rock fragments—5 to 15 percent pebbles

Reaction—pH 6.6 to 7.8

*Bt horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 3 or 4 moist

Chroma—2 or 3

Clay content—10 to 18 percent

Content of rock fragments—10 to 30 percent pebbles

Reaction—pH 6.6 to 7.8

*Bk horizon:*

Hue—10YR or 2.5Y

Value—6 or 7 dry; 5 or 6 moist

Chroma—2 or 3

Clay content—5 to 18 percent

Content of rock fragments—15 to 45 percent pebbles

Calcium carbonate equivalent—5 to 20 percent

Reaction—pH 7.4 to 8.4

## Cheadle Series

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, ridges, and side slopes of mountains

*Parent material:* Residuum derived from hard, fine grained sandstone or igneous rock

*Slope range:* 4 to 50 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Lithic Haplocryolls

### Typical Pedon

Cheadle very gravelly loam, in an area of Cheadle, very stony-Rock outcrop-Tiban, bouldery, complex, 15 to 45 percent slopes, in rangeland, 950 feet west and 1,500 feet north of the southeast corner of sec. 4, T. 5 N., R. 2 E.

A—0 to 4 inches; dark brown (10YR 3/3) very gravelly loam, very dark brown (10YR 2/2) moist; moderate fine and very fine granular structure; soft, very friable, slightly sticky and nonplastic; many fine and very fine roots; 5 percent angular cobbles and 50 percent angular pebbles; neutral (pH 6.6); clear wavy boundary.

Bw1—4 to 11 inches; brown (10YR 4/3) very gravelly loam, dark brown (10YR 3/3) moist; strong fine and very fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots and common medium roots; 10 percent angular cobbles and 45 percent angular pebbles; neutral (pH 6.8); clear wavy boundary.

Bw2—11 to 15 inches; dark yellowish brown (10YR 4/4) extremely gravelly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many fine and very fine roots and common medium roots; 15 percent angular cobbles and 55 percent angular pebbles; neutral (pH 7.0); clear wavy boundary.

Bk—15 to 18 inches; brown (10YR 5/3) extremely gravelly loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common fine and very fine roots matted between rock fragments; 20 percent angular cobbles and 50 percent angular pebbles; disseminated lime, continuous faint lime coatings on undersides of rock fragments; strongly effervescent; moderately alkaline (pH 8.2); abrupt smooth boundary.

R—18 inches; pale brown (10YR 6/3), fractured, hard, fine grained sandstone.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the lithic contact (if it occurs at a depth of less than 12 inches)

*Thickness of the mollic epipedon:* 7 to 12 inches

*Depth to Bk horizon:* 12 to 16 inches

*Depth to bedrock:* 10 to 20 inches

*Percent of surface covered by stones/boulders:* 0.1 to 3.0 percent

*A horizon:*

Hue—2.5Y or 10YR

Value—3, 4, or 5 dry; 2 or 3 moist

Chroma—2 or 3

Clay content—15 to 27 percent

Content of rock fragments—15 to 60 percent (5 to 30 percent cobbles and stones; 5 to 50 percent pebbles)

Reaction—pH 6.1 to 7.3

*Bw horizon:*

Hue—2.5Y or 10YR

Value—4 or 5 dry; 2 or 3 moist

Chroma—2, 3, or 4

Texture—loam or sandy loam

Clay content—15 to 25 percent

Content of rock fragments—35 to 70 percent (10 to 30 percent cobbles and stones, 25 to 55 percent pebbles)

Reaction—pH 6.1 to 7.3

*Bk horizon:*

Hue—2.5Y or 10YR

Value—5 or 6 dry; 4 or 5 moist

Chroma—3 or 4

Clay content—10 to 25 percent

Content of rock fragments—35 to 75 percent (20 to 35 percent cobbles and stones, 15 to 50 percent pebbles)

Calcium carbonate equivalent—3 to 10 percent

Reaction—pH 7.4 to 8.4

### Chinook Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Alluvial fans, stream terraces, footslopes, and side slopes of hills

*Parent material:* Sandy alluvium or eolian deposits

*Slope range:* 0 to 25 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Coarse-loamy, mixed, superactive, frigid Aridic Haplustolls

### Typical Pedon

Chinook sandy loam, 2 to 8 percent slopes, in rangeland, 1,200 feet west and 500 feet south of the northeast corner of sec. 28, T. 1 N., R. 1 W.

A—0 to 7 inches; brown (10YR 4/3) sandy loam, dark brown (10YR 3/3) moist; weak fine and very fine granular structure; soft, very friable, nonsticky and nonplastic; many fine roots; slightly alkaline (pH 7.8); abrupt smooth boundary.

Bw—7 to 15 inches; brown (10YR 4/3) sandy loam, dark brown (10YR 3/3) moist; weak fine prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, very friable, nonsticky and nonplastic; many fine roots; many very fine pores; slightly alkaline (pH 7.8); clear smooth boundary.

Bk1—15 to 54 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; weak coarse prismatic structure; slightly hard, very friable, nonsticky and nonplastic; few fine roots; few very fine pores; disseminated lime, common fine threads and masses of lime; violently effervescent; moderately alkaline (pH 8.2); gradual wavy boundary.

Bk2—54 to 60 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine roots; few very fine pores; disseminated lime, few fine threads of lime; violently effervescent; moderately alkaline (pH 8.4).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches

*Thickness of the mollic epipedon:* 7 to 15 inches

*Depth to Bk horizon:* 10 to 25 inches

#### A horizon:

Value—2 or 3 moist

Chroma—2 or 3

Texture—sandy loam or sandy clay loam

Clay content—10 to 27 percent

Content of rock fragments—0 to 15 percent pebbles

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 6.6 to 7.8; pH 7.9 to 9.0 in the saline phase

Electrical conductivity—4 to 16 mmhos/cm (saline phase)

Sodium adsorption ratio—0 to 8 (saline phase)

#### Bw horizon:

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2, 3, or 4

Texture—fine sandy loam or sandy loam

Clay content—5 to 18 percent

Content of rock fragments—0 to 15 percent pebbles

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 6.6 to 8.4; pH 8.5 to 9.0 in the saline phase

Electrical conductivity—8 to 16 mmhos/cm (saline phase)

Sodium adsorption ratio—4 to 13 (saline phase)

#### Bk horizon:

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—2, 3, or 4

Clay content—5 to 18 percent

Content of rock fragments—0 to 15 percent pebbles

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.4 to 8.4; pH 8.5 to 9.0 in the saline phase

Electrical conductivity—2 to 16 mmhos/cm (saline phase)

Sodium adsorption ratio—0 to 13 (saline phase)

### Clancy Series

*Depth class:* Moderately deep (20 to 40 inches) to weathered granite bedrock and deep (40 to 60 inches) to hard granite bedrock

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, hills, and ridges

*Parent material:* Local colluvium and residuum derived from granite

*Slope range:* 2 to 45 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Typic Argiustolls

### Typical Pedon

Clancy sandy clay loam, in an area of Burtoner-Clancy-Connieo complex, 4 to 15 percent slopes, in rangeland, 800 feet south and 1,100 feet west of the northeast corner of sec. 30, T. 9 N., R. 2 W.

A—0 to 8 inches; dark brown (10YR 3/3) sandy clay loam, very dark brown (10YR 2/2) moist; weak

medium and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and few fine roots; many very fine and fine pores; 10 percent granite pebbles; neutral (pH 7.0); clear smooth boundary.

Bt1—8 to 15 inches; yellowish brown (10YR 5/4) gravelly sandy clay loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate medium and fine subangular blocky; slightly hard, friable, moderately sticky and slightly plastic; many very fine and few fine roots; many very fine and few fine pores; many faint clay films bridging sand grains and on faces of peds; 20 percent granite pebbles; neutral (pH 6.9); clear smooth boundary.

Bt2—15 to 22 inches; light olive brown (2.5Y 5/4) gravelly sandy clay loam, olive brown (2.5Y 4/4) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and few fine roots; many very fine and few fine pores; common faint clay films bridging sand grains and on faces of peds; 25 percent granite pebbles; neutral (pH 6.8); clear wavy boundary.

BC—22 to 30 inches; olive brown (2.5Y 4/4) gravelly coarse sandy loam, dark grayish brown (2.5Y 4/2) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; few very fine roots; common very fine pores; 30 percent granite pebbles; neutral (pH 6.6); clear irregular boundary.

Cr—30 to 55 inches; olive gray (5Y 5/2), decomposed granite bedrock (grus) that crushes to very gravelly loamy coarse sand.

R—55 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 15 inches

*Depth to Bt horizon:* 6 to 12 inches

*Depth to Cr horizon:* 20 to 40 inches

*Depth to R layer:* 40 to 60 inches

*Percent of surface covered by stones/boulders:* 0 to 3 percent

#### *A horizon:*

Hue—10YR or 2.5Y

Value—3 or 4 dry; 2 or 3 moist

Chroma—2 or 3

Texture—loam, sandy loam, coarse sandy loam, or sandy clay loam

Clay content—15 to 25 percent

Content of rock fragments—5 to 25 percent pebbles

Reaction—pH 6.1 to 7.3

#### *Bt horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 3 or 4 moist

Chroma—3, 4, or 6

Texture—sandy clay loam or clay loam

Clay content—20 to 30 percent

Content of rock fragments—10 to 35 percent pebbles

Reaction—pH 6.6 to 7.3

#### *BC horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 4 or 5 moist

Chroma—2, 3, 4, or 6

Texture—coarse sandy loam or sandy loam

Clay content—10 to 18 percent

Content of rock fragments—10 to 35 percent pebbles

Reaction—pH 6.1 to 7.3

## Clasoil Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans and sides of hills

*Parent material:* Alluvium derived mainly from granite

*Slope range:* 2 to 35 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Typic Argiustolls

### Typical Pedon

Clasoil gravelly loam, in an area of Sawicki-Clasoil complex, 8 to 35 percent slopes, bouldery, warm, in rangeland, 500 feet north and 1,000 feet east of the southwest corner of sec. 13, T. 9 N., R. 2 W.

A1—0 to 5 inches; very dark grayish brown (10YR 3/2) gravelly loam, black (10YR 2/1) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and few fine and medium roots; 5 percent cobbles, 10 percent pebbles; slightly acid (pH 6.2); clear smooth boundary.

A2—5 to 13 inches; dark grayish brown (10YR 4/2)

gravelly loam, very dark gray (10YR 3/1) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; many very fine and few fine and medium roots; many very fine and common fine pores; 5 percent cobbles, 25 percent pebbles; slightly acid (pH 6.2); clear smooth boundary.

Bt1—13 to 24 inches; light yellowish brown (10YR 6/4) gravelly sandy clay loam, yellowish brown (10YR 5/4) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, moderately sticky and moderately plastic; common very fine roots and few fine and medium roots; common very fine and fine pores; common distinct clay films on faces of pedis and bridging sand grains; 5 percent cobbles, 15 percent pebbles; neutral (pH 6.7); clear smooth boundary.

Bt2—24 to 34 inches; light yellowish brown (2.5Y 6/4) cobbly sandy clay loam, yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; common very fine and few fine and medium roots; common very fine and few fine pores; common distinct clay films on faces of pedis and bridging sand grains; 20 percent cobbles, 10 percent pebbles; neutral (pH 6.7); clear smooth boundary.

BC—34 to 60 inches; light yellowish brown (10YR 6/4) very cobbly loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; 25 percent cobbles, 15 percent pebbles; neutral (pH 6.6).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 15 inches

*Depth to Bt horizon:* 7 to 22 inches

*Percent of surface covered by stones/boulders:* 0 to 3 percent

#### A horizon:

Hue—10YR or 2.5Y

Value—2, 3, or 4 dry; 2 or 3 moist

Chroma—1, 2, or 3

Texture—loam or sandy loam

Clay content—12 to 20 percent

Content of rock fragments—0 to 35 percent (0 to 10 percent cobbles and stones, 0 to 25 percent pebbles)

Reaction—pH 5.6 to 7.3

#### Bt horizon:

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—sandy clay loam, loam, or clay loam

Clay content—18 to 30 percent

Content of rock fragments—5 to 35 percent (0 to 20 percent stones and cobbles, 5 to 30 percent pebbles)

Reaction—pH 5.6 to 7.3

#### BC horizon:

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—3, 4, or 6

Texture—sandy loam, loam, or coarse sandy loam

Clay content—12 to 20 percent

Content of rock fragments—15 to 40 percent (0 to 25 percent stones and cobbles, 15 to 35 percent pebbles)

Reaction—pH 6.1 to 7.8

## Clugulch Series

*Depth class:* Very shallow (0 to 10 inches)

*Drainage class:* Well drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Ridges and side slopes of mountains

*Parent material:* Residuum derived from granite

*Slope range:* 2 to 70 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy, mixed, superactive Lithic Eutrocryepts

### Typical Pedon

Clugulch sandy loam, in an area of Branham-Clugulch-Rock outcrop complex, 2 to 15 percent slopes; in a forested area, 2,000 feet south and 1,350 feet west of the northeast corner of sec. 5, T. 1 S., R. 6 W.

Oi—2 inches to 0; forest litter of partially decomposed twigs, needles, and lichens.

A—0 to 3 inches; dark grayish brown (10YR 4/2) sandy loam, black (10YR 2/1) moist; moderate very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; 10 percent granite pebbles; neutral (pH 6.7); clear wavy boundary.

Bw—3 to 7 inches; light brownish gray (10YR 6/2) gravelly coarse sandy loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; many very fine and fine roots; 20 percent granite pebbles; slightly acid (pH 6.5); abrupt wavy boundary.

Cr—7 to 9 inches; light brownish gray (10YR 6/2), decomposing granite (grus) that textures to gravelly loamy sand.

R—9 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between a depth of 4 inches and the lithic contact

*Depth to Cr horizon:* Less than 10 inches

*Depth to R layer:* Less than 10 inches

*Percent of surface covered by stones/boulders:* 0 to 0.1 percent

#### A horizon:

Hue—10YR or 2.5Y

Value—4 or 5 dry

Chroma—1, 2, or 3

Texture—sandy loam or coarse sandy loam

Clay content—10 to 18 percent

Content of rock fragments—0 to 25 percent pebbles

Reaction—pH 6.1 to 7.3

#### Bw horizon:

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2 or 3

Texture—coarse sandy loam or sandy loam

Clay content—5 to 15 percent

Content of rock fragments—5 to 35 percent pebbles

Reaction—pH 6.1 to 7.3

## Clunton Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Very poorly drained

*Permeability:* Moderately slow (0.2 to 0.6 inch per hour)

*Landform:* Flood plains and flood-plain steps

*Parent material:* Recent alluvium derived from mixed rock sources

*Slope range:* 0 to 4 percent

*Elevation range:* 3,800 to 5,500 feet

*Annual precipitation:* 10 to 17 inches

*Annual air temperature:* 38 to 44 degrees F

*Frost-free period:* 80 to 115 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Fluvaquentic Endoaquolls

### Typical Pedon

Clunton silty clay loam, 0 to 2 percent slopes, in a grass hay meadow, 1,600 feet north and 1,200 feet west of the southeast corner of sec. 30, T. 4 N., R. 2 W.

Oe—4 inches to 0; very dark gray (5Y 3/1) mucky peat, very dark gray (5Y 3/1) dry; neutral (pH 6.8); abrupt smooth boundary.

Ag—0 to 14 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; many distinct black (5Y 2.5/1) redox depletions; few faint strong brown (7.5YR 5/6) redox concentrations; moderate medium prismatic structure; hard, firm, moderately sticky and moderately plastic; common very fine roots; common very fine and fine pores; neutral (pH 7.0); abrupt smooth boundary.

Cg1—14 to 26 inches; very dark gray (5Y 3/1) silty clay loam, dark gray (5Y 4/1) dry; common faint very dark gray (5Y 3/1) redox depletions; many distinct strong brown (7.5YR 5/6) redox concentrations; massive; hard, firm, moderately sticky and moderately plastic; common very fine roots; few very fine pores; neutral (pH 7.2); clear wavy boundary.

Cg2—26 to 30 inches; very dark gray (5Y 3/1) loam consisting of strata of loam and sandy loam, dark gray (5Y 4/1) dry; common distinct strong brown (7.5YR 5/6) redox concentrations; common faint very dark gray (5Y 3/1) redox depletions; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; neutral (pH 7.2); gradual wavy boundary.

Cg3—30 to 38 inches; dark gray (5Y 4/1) silty clay loam consisting of strata of silty clay loam and sandy loam, gray (5Y 5/1) dry; common distinct strong brown (7.5YR 5/6) redox concentrations; common faint very dark gray (5Y 3/1) redox depletions; massive; slightly hard, friable, slightly sticky and slightly plastic; neutral (pH 7.0); gradual wavy boundary.

2Cg4—38 to 60 inches; dark gray (10YR 4/1) gravelly sandy loam, grayish brown (2.5Y 5/2) dry; many distinct strong brown (7.5YR 5/6) redox concentrations; few faint very dark gray (5Y 3/1) redox depletions; massive; slightly hard, friable, slightly sticky and nonplastic; 15 percent pebbles; neutral (pH 7.0).

### Range in Characteristics

*Soil temperature:* 40 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 10 to 24 inches

*Water table:* At the surface to 12 inches below the surface for extended periods during spring and summer

*Ag horizon:*

Hue—10YR, 2.5Y, or 5Y

Value—4 or 5 dry; 3 or 4 moist

Chroma—1 or 2

Texture—silty clay loam, loam, or silt loam

Clay content—15 to 30 percent

Reaction—pH 6.1 to 7.3

*Cg1 horizon:*

Hue—10YR, 2.5Y, or 5Y

Value—4 or 5 dry

Chroma—1 or 2

Texture—silty clay loam, loam, silt loam, or clay loam

Clay content—18 to 35 percent

Content of rock fragments—0 to 10 percent pebbles

Reaction—pH 6.6 to 7.8

*Cg2 and Cg3 horizons:*

Hue—2.5Y or 5Y

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Texture—silt loam, loam, clay loam, or silty clay loam with thin strata of finer and coarser materials

Clay content—18 to 35 percent

Content of rock fragments—0 to 10 percent pebbles

Reaction—pH 6.6 to 7.8

*2Cg4 horizon:*

Hue—10YR, 2.5Y, 5Y, or N

Value—4 or 5 dry; 3 or 4 moist

Chroma—0 to 2

Texture—sandy loam or loam with strata of loamy sand, silt loam, or very fine sandy loam

Clay content—5 to 25 percent

Content of rock fragments—0 to 25 percent pebbles

Reaction—pH 6.6 to 7.8

## Cometcrik Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Poorly drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Flood plains, flood-plain steps, and drainageways

*Parent material:* Recent alluvium derived from mixed rock sources

*Slope range:* 0 to 8 percent

*Elevation range:* 4,600 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Cumulic Endoaquolls

### Typical Pedon

Cometcrik loam, in an area of Breton-Cometcrik complex, 2 to 8 percent slopes, in rangeland, 2,000 feet north and 2,100 feet west of the southeast corner of sec. 13, T. 7 N., R. 4 W.

A—0 to 12 inches; black (10YR 2/1) loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; hard, very friable, moderately sticky and slightly plastic; many very fine and fine and common medium roots; neutral (pH 6.8); gradual smooth boundary.

Bw—12 to 24 inches; black (10YR 2/1) loam, very dark grayish brown (10YR 3/2) dry; few fine distinct yellowish red (5YR 4/6) (dry) redox concentrations; weak medium subangular blocky structure; very hard, very friable, moderately sticky and slightly plastic; many very fine roots and common fine and medium roots; many very fine and common fine pores; neutral (pH 6.8); clear smooth boundary.

Cg1—24 to 42 inches; very dark gray (10YR 3/1) silty clay loam, grayish brown (2.5Y 5/2) dry; common fine distinct yellowish red (5YR 4/6) (dry) redox concentrations; massive; extremely hard, firm, very sticky and moderately plastic; few very fine and fine roots; few very fine and fine pores; 5 percent pebbles; neutral (pH 7.0); gradual wavy boundary.

2Cg2—42 to 58 inches; brown (10YR 5/3) gravelly loamy coarse sand, pale brown (10YR 6/3) dry; massive; hard, very friable, nonsticky and nonplastic; 30 percent pebbles; neutral (pH 7.0); clear wavy boundary.

3Cg3—58 to 60 inches; dark gray (10YR 4/1) loam consisting of fine strata of very fine sandy loam and silty clay loam, grayish brown (10YR 5/2) dry; common medium distinct strong brown (7.5YR 5/6) (dry) redox concentrations; massive; very hard, friable, moderately sticky and slightly plastic; 5 percent pebbles; neutral (pH 7.0).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 24 to 60 inches

*Depth to seasonal high water table:* 12 to 24 inches during the spring and early summer

*Depth to 2Cg horizon:* 40 to 60 inches

*A horizon:*

Hue—10YR or 2.5Y

Value—3 or 4 dry; 2 or 3 moist

Chroma—1 or 2

Clay content—18 to 27 percent

Content of rock fragments—0 to 10 percent pebbles

Reaction—pH 6.1 to 7.3

*Bw horizon:*

Hue—10YR or 2.5Y

Value—3 or 4 dry; 2 or 3 moist

Chroma—1 or 2

Texture—loam, silt loam, or silty clay loam

Clay content—18 to 35 percent

Content of rock fragments—0 to 10 percent pebbles

Reaction—pH 6.1 to 7.3

*Cg horizon:*

Hue—10YR, 7.5YR, or 2.5Y

Value—4, 5, or 6 dry; 2 or 3 moist

Chroma—1 or 2

Texture—loam, silt loam, or silty clay loam

Clay content—18 to 35 percent clay

Content of rock fragments—0 to 10 percent pebbles

Reaction—pH 6.1 to 7.3

*2Cg horizon:*

Hue—10YR, 7.5YR, or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—1, 2, or 3

Texture—coarse sand, loamy coarse sand, or coarse sandy loam

Clay content—2 to 10 percent clay

Content of rock fragments—15 to 35 percent pebbles

Reaction—pH 6.1 to 7.3

*3Cg horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—1 or 2

Texture—stratified fine sandy loam to silty clay loam

Clay content—10 to 35 percent

Content of rock fragments—0 to 35 percent (0 to 5 percent cobbles, 0 to 30 percent pebbles)

Reaction—pH 6.1 to 7.8

## Connieo Series

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, ridges, and side slopes of hills

*Parent material:* Residuum derived from granite

*Slope range:* 2 to 60 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy, mixed, superactive, frigid Lithic Argiustolls

### Typical Pedon

Connieo sandy clay loam, in an area of Burtoner-Connieo, bouldery-Rock outcrop complex, 4 to 15 percent slopes, in rangeland, 2,400 feet south and 100 feet west of the northeast corner of sec. 11, T. 5 N., R. 4 W.

A—0 to 8 inches; dark grayish brown (10YR 4/2) sandy clay loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and few fine roots; 5 percent granite pebbles; neutral (pH 7.2); clear smooth boundary.

Bt—8 to 14 inches; brown (10YR 5/3) gravelly sandy clay loam, brown (10YR 4/3) moist; weak medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, moderately sticky and slightly plastic; common very fine and few fine roots; many very fine and few fine pores; common faint clay films on faces of peds and bridging sand grains; 25 percent granite pebbles; slightly alkaline (pH 7.6); clear smooth boundary.

Cr—14 to 18 inches; light brownish gray (2.5Y 6/2), decomposing granite bedrock (grus) that crushes to very gravelly loamy coarse sand.

R—18 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the lithic contact (if it occurs at a depth of less than 12 inches)

*Thickness of the mollic epipedon:* 7 to 12 inches

*Depth to Bt horizon:* 5 to 12 inches

*Depth to Cr horizon:* 10 to 18 inches

*Depth to R layer:* 12 to 20 inches

*Percent of surface covered by stones/boulders:* 0 to 15 percent

*A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 2 or 3 moist

Chroma—2 or 3

Texture—coarse sandy loam, sandy loam, or sandy clay loam

Clay content—14 to 24 percent

Content of rock fragments—5 to 60 percent (0 to 15 percent stones and cobbles, 5 to 50 percent pebbles)

Reaction—pH 6.1 to 7.3

*Bt horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 3 or 4 moist

Chroma—2, 3, or 4

Clay content—20 to 30 percent

Content of rock fragments—10 to 35 percent pebbles

Reaction—pH 6.1 to 7.8

## Cowood Family

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, ridges, and side slopes of mountains

*Parent material:* Residuum derived from fine grained sandstone and igneous rock

*Slope range:* 4 to 70 percent

*Elevation range:* 5,500 to 8,500 feet

*Annual precipitation:* 15 to 30 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 30 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Lithic Eutrocrepts

### Typical Pedon

Cowood extremely cobbly loam, in an area of Warwood-Tigeron, very stony-Cowood, very stony, complex, 25 to 60 percent slopes; in a forested area, 400 feet south and 950 feet east of the northwest corner of sec. 4, T. 8 N., R. 4 W.

Oi—2 inches to 0; forest litter of partially decomposed needles and twigs.

A—0 to 4 inches; grayish brown (10YR 5/2) extremely cobbly loam, dark grayish brown (10YR 4/2) moist; weak very fine and fine granular structure; soft,

very friable, slightly sticky and slightly plastic; many very fine and fine and few medium roots; 50 percent cobbles and 15 percent pebbles; neutral (pH 6.8); clear smooth boundary.

Bw—4 to 17 inches; pale brown (10YR 6/3) extremely cobbly loam, brown (10YR 4/3) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine pores; 50 percent cobbles and 20 percent pebbles; neutral (pH 6.7); abrupt wavy boundary.

R—17 inches; hard, fine grained igneous bedrock.

### Range in Characteristics

*Soil temperature:* 36 to 40 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the lithic contact (if it occurs at a depth of less than 12 inches)

*Depth to bedrock:* 10 to 20 inches

*Percent of surface covered by stones/boulders:* 0 to 30 percent

*A horizon:*

Value—5 or 6 dry; 4 or 5 moist

Chroma—2 or 3

Texture—loam or sandy loam

Clay content—10 to 27 percent

Content of rock fragments—25 to 70 percent (10 to 50 percent cobbles and stones, 15 to 40 percent pebbles or channers)

Reaction—pH 5.6 to 7.3

*Bw horizon:*

Value—5 or 6 dry; 4 or 5 moist

Chroma—3, 4, or 6

Texture—loam or sandy loam

Clay content—5 to 25 percent

Content of rock fragments—60 to 80 percent (25 to 60 percent cobbles and stones, 20 to 35 percent pebbles)

Reaction—pH 5.1 to 7.3

## Cozberg Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Alluvial fans, stream terraces, and valley floors

*Parent material:* Alluvium

*Slope range:* 0 to 15 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Coarse-loamy, mixed, superactive, frigid Aridic Haplustolls

### Typical Pedon

Cozberg sandy loam, 2 to 8 percent slopes, in rangeland, 2,000 feet south and 2,200 feet west of the northeast corner of sec. 28, T. 1 N., R. 1 W.

A—0 to 5 inches; brown (10YR 4/3) sandy loam, dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and very fine roots; moderately alkaline (pH 8.0); abrupt smooth boundary.

Bw1—5 to 8 inches; brown (10YR 5/3) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; common fine pores; 15 percent pebbles; slightly effervescent; moderately alkaline (pH 8.2); clear wavy boundary.

Bw2—8 to 19 inches; pale brown (10YR 6/3) fine sandy loam, brown (10YR 5/3) moist; moderate medium and coarse prismatic structure; slightly hard, friable, slightly sticky and nonplastic; common fine and very fine roots; common fine and medium pores; disseminated lime, few fine threads and masses of lime; slightly effervescent; moderately alkaline (pH 8.4); clear wavy boundary.

Bk1—19 to 28 inches; very pale brown (10YR 7/3) loam, light brownish gray (10YR 6/2) moist; weak coarse prismatic structure; slightly hard, very friable, slightly sticky and nonplastic; few fine and very fine roots; common fine pores; 5 percent pebbles; disseminated lime, common fine threads and masses of lime, few faint lime coatings on pebbles; strongly effervescent; moderately alkaline (pH 8.2); clear wavy boundary.

2Bk2—28 to 36 inches; light yellowish brown (10YR 6/4) gravelly sandy loam, pale brown (10YR 6/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; 30 percent pebbles; disseminated lime, common medium threads and masses of lime, continuous distinct lime crusts on pebbles; strongly effervescent; moderately alkaline (pH 8.2); gradual wavy boundary.

2C—36 to 60 inches; yellowish brown (10YR 5/6) gravelly loamy sand, yellowish brown (10YR 5/6) moist; single grain; loose; nonsticky and

nonplastic; few very fine and fine roots; 30 percent pebbles; moderately alkaline (pH 8.0).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches

*Thickness of the mollic epipedon:* 7 to 12 inches

*Depth to Bk horizon:* 8 to 16 inches

*Percent of surface covered by stones:* 0 to 0.1 percent

#### A horizon:

Value—2 or 3 moist

Chroma—2 or 3

Clay content—10 to 20 percent

Content of rock fragments—0 to 15 percent pebbles

Reaction—pH 7.4 to 8.4

#### Bw horizon:

Value—5 or 6 dry; 3, 4, or 5 moist

Chroma—2 or 3

Texture—fine sandy loam or sandy loam

Clay content—10 to 18 percent

Content of rock fragments—0 to 15 percent pebbles

Reaction—pH 7.4 to 8.4

#### Bk1 horizon:

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Clay content—10 to 18 percent

Content of rock fragments—0 to 15 percent pebbles

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.4 to 8.4

#### 2Bk2 horizon:

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Clay content—0 to 10 percent

Content of rock fragments—0 to 30 percent pebbles

Calcium carbonate equivalent—15 to 35 percent

Reaction—pH 7.4 to 8.4

#### 2C horizon:

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, 4, or 6

Clay content—0 to 10 percent

Content of rock fragments—0 to 35 percent pebbles

Calcium carbonate equivalent—0 to 10 percent  
Reaction—pH 7.4 to 8.4

## Crackerville Series

*Depth class:* Moderately deep (20 to 40 inches)  
*Drainage class:* Well drained  
*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)  
*Landform:* Escarpments, ridges, and side slopes of hills  
*Parent material:* Local colluvium, slope alluvium, and residuum derived from granite  
*Slope range:* 2 to 60 percent  
*Elevation range:* 4,400 to 6,000 feet  
*Annual precipitation:* 15 to 19 inches  
*Annual air temperature:* 36 to 40 degrees F  
*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Argiustolls

### Typical Pedon

Crackerville loam, in an area of Crackerville-Catgulch complex, 2 to 15 percent slopes, bouldery, in rangeland, 600 feet south and 800 feet east of the northwest corner of sec. 16, T. 5 N., R. 2 W.

A—0 to 7 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and common fine roots; 10 percent granite pebbles; slightly acid (pH 6.2); clear smooth boundary.

Bt—7 to 15 inches; yellowish brown (10YR 5/4) very gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium and coarse prismatic structure parting to moderate medium and coarse subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine and few fine roots; common very fine and fine pores; common faint clay films on faces of peds and bridging sand grains; 40 percent pebbles; neutral (pH 7.2); clear wavy boundary.

BC—15 to 23 inches; pale brown (10YR 6/3) gravelly coarse sandy loam, brown (10YR 4/3) moist; weak coarse prismatic structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and few fine roots; common very fine and few fine pores; 30 percent pebbles; neutral (pH 7.2); clear wavy boundary.

Cr—23 to 31 inches; very pale brown (10YR 7/3), decomposed granite bedrock (grus) that crushes to very gravelly loamy coarse sand.

R—31 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F  
*Moisture control section:* Between the depths of 4 and 12 inches  
*Thickness of the mollic epipedon:* 7 to 15 inches  
*Depth to Bt horizon:* 7 to 15 inches  
*Depth to Cr horizon:* 20 to 38 inches  
*Depth to R layer:* 23 to 40 inches  
*Percent of surface covered by stones/boulders:* 0 to 0.1 percent

*A horizon:*  
Hue—10YR or 2.5Y  
Value—4 or 5 dry; 2 or 3 moist  
Chroma—2 or 3  
Texture—sandy clay loam, loam, or coarse sandy loam  
Clay content—14 to 27 percent  
Content of rock fragments—0 to 35 percent (0 to 15 percent stones and cobbles, 5 to 20 percent pebbles)  
Reaction—pH 5.1 to 7.3

*Bt horizon:*  
Hue—10YR or 2.5Y  
Value—5 or 6 dry; 3 or 4 moist  
Chroma—3, 4, or 6 dry  
Clay content—20 to 30 percent  
Content of rock fragments—35 to 60 percent (0 to 15 percent cobbles, 35 to 45 percent pebbles)  
Reaction—pH 6.6 to 7.8

*BC horizon:*  
Hue—10YR or 2.5Y  
Value—5 or 6 dry; 4 or 5 moist  
Chroma—3, 4, or 6 dry  
Texture—sandy loam, coarse sandy loam, or loamy coarse sand  
Clay content—5 to 15 percent  
Content of rock fragments—30 to 70 percent (0 to 15 percent cobbles, 30 to 55 percent pebbles)  
Reaction—pH 6.6 to 7.8

## Crago Series

*Depth class:* Very deep (greater than 60 inches)  
*Drainage class:* Well drained  
*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)  
*Landform:* Alluvial fans, escarpments, plains, and side slopes of hills  
*Parent material:* Alluvium or colluvium derived mainly from limestone

*Slope range:* 1 to 60 percent

*Elevation range:* 3,800 to 5,500 feet

*Annual precipitation:* 10 to 15 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 80 to 115 days

**Taxonomic classification:** Loamy-skeletal,  
carbonatic, frigid Aridic Calcustepts

### Typical Pedon

Crago gravelly loam, 2 to 8 percent slopes, in rangeland, 750 feet south and 3,350 feet east of the northwest corner of sec. 8, T. 3 N., R. 1 W.

A—0 to 4 inches; brown (10YR 5/3) gravelly loam, brown (10YR 4/3) moist; moderate fine and medium granular structure; soft, very friable, slightly sticky and nonplastic; many very fine roots; 20 percent pebbles; strongly effervescent; moderately alkaline (pH 8.0); clear wavy boundary.

Bk1—4 to 12 inches; yellowish brown (10YR 5/4) gravelly loam, brown (10YR 5/3) moist; weak medium and coarse prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; few fine pores; 25 percent pebbles; disseminated lime, continuous prominent lime crusts on undersides of pebbles; violently effervescent; moderately alkaline (pH 8.4); clear wavy boundary.

Bk2—12 to 20 inches; very pale brown (10YR 7/3) gravelly clay loam, pale brown (10YR 6/3) moist; weak coarse prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; few fine roots; few fine pores; 35 percent pebbles; disseminated lime, common medium masses and threads of lime, continuous prominent lime crusts on pebbles; violently effervescent; moderately alkaline (pH 8.4); gradual irregular boundary.

Bk3—20 to 50 inches; white (10YR 8/2) very gravelly loam, pale brown (10YR 6/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; 5 percent cobbles, 40 percent pebbles; disseminated lime, many fine masses and threads of lime, continuous prominent lime crusts on pebbles; violently effervescent; strongly alkaline (pH 8.6); gradual irregular boundary.

2C—50 to 60 inches; light gray (10YR 7/2) very gravelly sandy loam, pale brown (10YR 6/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; very few fine roots; 10 percent cobbles, 45 percent pebbles; disseminated lime; violently effervescent; strongly alkaline (pH 8.6).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Percent of surface covered by stones/boulders:* 0 to 20 percent

*A horizon:*

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2 or 3

Clay content—15 to 27 percent

Content of rock fragments—0 to 60 percent (0 to 30 percent stones and cobbles, 0 to 45 percent pebbles)

Calcium carbonate equivalent—3 to 15 percent

Reaction—pH 7.4 to 8.4

*Bk1 horizon:*

Hue—10YR or 2.5Y

Value—5, 6, 7, or 8 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—loam or sandy loam

Clay content—15 to 27 percent

Content of rock fragments—15 to 75 percent (0 to 30 percent stones and cobbles, 15 to 60 percent pebbles)

Calcium carbonate equivalent—40 to 70 percent

Reaction—pH 7.4 to 9.0

*Bk2 and Bk3 horizons:*

Hue—2.5Y or 10YR

Value—6, 7, or 8 dry; 4, 5, 6, or 7 moist

Chroma—2, 3, or 4

Texture—loam, clay loam, or sandy loam

Clay content—15 to 35 percent

Content of rock fragments—35 to 75 percent (0 to 30 percent stones and cobbles, 35 to 45 percent pebbles)

Calcium carbonate equivalent—40 to 70 percent

Reaction—pH 7.4 to 9.0

*2C horizon:*

Hue—2.5Y or 10YR

Value—6, 7, or 8 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—loamy sand, coarse sandy loam, or sandy loam

Clay content—0 to 20 percent

Content of rock fragments—40 to 80 percent (0 to 40 percent stones and cobbles, 40 to 80 percent pebbles)

Calcium carbonate equivalent—15 to 50 percent

Reaction—pH 7.4 to 9.0

## Crampton Series

*Depth class:* Moderately deep (20 to 40 inches) to weathered granite bedrock and deep (40 to 60 inches) to hard granite bedrock

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, ridges, and hills

*Parent material:* Local colluvium, slope alluvium, and residuum derived from hard, fine grained and coarse grained igneous rocks deposited over granite bedrock

*Slope range:* 15 to 60 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Argiustolls

### Typical Pedon

Crampton very cobbly sandy loam, in an area of Sawicki, very bouldery-Crampton, bouldery-Catgulch, bouldery, complex, 15 to 45 percent slopes, in rangeland, 100 feet north and 450 feet east of the southwest corner of sec. 35, T. 8 N., R. 4 W.

A—0 to 11 inches; dark grayish brown (10YR 4/2) very cobbly sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots and few fine and medium roots; many very fine and fine pores; 25 percent angular cobbles and 20 percent angular pebbles; neutral (pH 7.2); gradual wavy boundary.

Bt1—11 to 21 inches; yellowish brown (10YR 5/4) very cobbly sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; many very fine roots and few fine and medium roots; many very fine and fine pores; many faint clay films on faces of peds and bridging sand grains; 25 percent angular cobbles and 20 percent angular pebbles; neutral (pH 7.3); gradual wavy boundary.

Bt2—21 to 30 inches; brown (10YR 5/3) very cobbly coarse sandy loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine and fine pores; common faint clay films bridging sand grains; 25 percent angular cobbles

and 30 percent angular pebbles; neutral (pH 7.1); clear wavy boundary.

BC—30 to 35 inches; pale brown (10YR 6/3) gravelly coarse sandy loam, brown (10YR 5/3) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; 30 percent granite pebbles; neutral (pH 6.8); clear wavy boundary.

Cr—35 to 59 inches; yellowish brown (10YR 5/4), decomposed granite bedrock (grus) that crushes to very gravelly loamy coarse sand.

R—59 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 15 inches

*Depth to Bt horizon:* 7 to 13 inches

*Depth to Cr horizon:* 20 to 40 inches

*Depth to R layer:* 40 to 60 inches

*Percent of surface covered by stones/boulders:* 1 to 5 percent

#### A horizon:

Hue—10YR or 2.5Y

Value—3 or 4 dry; 2 or 3 moist;

Chroma—1, 2, or 3

Texture—sandy loam, sandy clay loam, or coarse sandy loam

Clay content—10 to 25 percent

Content of rock fragments—0 to 60 percent (0 to 30 percent cobbles and stones, 0 to 30 percent pebbles)

Reaction—pH 6.6 to 7.3

#### Bt horizon:

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—coarse sandy loam, sandy clay loam, or loam

Clay content—18 to 30 percent

Content of rock fragments—35 to 60 percent (10 to 30 percent cobbles and stones, 20 to 30 percent pebbles)

Reaction—pH 6.1 to 7.3

#### BC horizon:

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—3, 4, or 6

Texture—coarse sandy loam or sandy loam

Clay content—10 to 18 percent

Content of rock fragments—15 to 45 percent (0 to 10 percent cobbles, 15 to 35 percent pebbles)

Reaction—pH 6.1 to 7.3

## Delpoint Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, knolls, and hills

*Parent material:* Alluvium and residuum derived from semiconsolidated loamy sedimentary beds

*Slope range:* 2 to 15 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Aridic Haplustepts

### Typical Pedon

Delpoint loam, in an area of Delpoint-Abor complex, 4 to 15 percent slopes, in cropland, 1,160 feet east and 550 feet south of the northwest corner of sec. 11, T. 3 N., R. 1 W.

Ap—0 to 8 inches; brown (10YR 5/3) loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; many fine pores; 1 percent rounded pebbles; slightly effervescent; moderately alkaline (pH 8.2); clear smooth boundary.

Bw—8 to 16 inches; pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; weak coarse prismatic structure parting to moderate medium blocky; slightly hard, friable, slightly sticky and moderately plastic; many fine and very fine roots; many fine and very fine pores; 10 percent rounded pebbles; strongly effervescent; strongly alkaline (pH 8.6); clear wavy boundary.

Bk—16 to 24 inches; pale brown (10YR 6/3) clay loam, grayish brown (10YR 5/2) moist; weak coarse prismatic structure; hard, friable, moderately sticky and moderately plastic; common fine and very fine roots; many fine and very fine pores; 10 percent rounded pebbles; disseminated lime, common fine masses of lime, common faint lime coatings on undersides of fragments; strongly effervescent; strongly alkaline (pH 8.8); gradual wavy boundary.

Cr—24 to 60 inches; light gray (10YR 7/1), semiconsolidated loamy sedimentary beds.

## Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bk horizon:* 10 to 20 inches

*Depth to Cr horizon:* 20 to 40 inches

*Ap horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 3, 4, or 5 moist

Chroma—2, 3, or 4

Texture—loam or clay loam

Clay content—20 to 35 percent

Content of rock fragments—0 to 5 percent pebbles

Reaction—pH 6.6 to 8.4

*Bw horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—loam, clay loam, or silty clay loam

Clay content—18 to 35 percent clay

Content of rock fragments—0 to 15 percent pebbles

Reaction—pH 7.9 to 9.0

*Bk horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—loam, clay loam, or silty clay loam

Clay content—18 to 35 percent clay

Content of rock fragments—0 to 15 percent pebbles

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.9 to 9.0

## Devilence Series

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Somewhat excessively drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Escarpments, ridges, and side slopes of hills

*Parent material:* Residuum derived from hard, brown shale or argillite

*Slope range:* 2 to 60 percent

*Elevation range:* 4,400 to 6,500 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Lithic Haplustepts

### Typical Pedon

Devilfence very channery loam, 4 to 15 percent slopes, in rangeland, 1,500 feet south and 325 feet west of the northeast corner of sec. 34, T. 4 N., R. 2 W.

A—0 to 3 inches; grayish brown (10YR 5/2) very channery loam, dark grayish brown (10YR 4/2) moist; moderate medium granular structure; slightly hard, very friable, nonsticky and nonplastic; common fine and many very fine roots; 40 percent channers; slightly alkaline (pH 7.6); clear wavy boundary.

Bw—3 to 7 inches; brown (10YR 5/3) very channery loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common fine and very fine roots; common fine and very fine pores; 5 percent flagstones and 40 percent channers; slightly effervescent; slightly alkaline (pH 7.8); clear wavy boundary.

Bk1—7 to 11 inches; pale brown (10YR 6/3) extremely channery loam, brown (10YR 5/3) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common fine and very fine pores; 10 percent flagstones and 55 percent channers; disseminated lime, common distinct lime coatings on rock fragments; strongly effervescent; moderately alkaline (pH 8.0); gradual wavy boundary.

Bk2—11 to 14 inches; pale brown (10YR 6/3) extremely channery loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few very fine roots between channers; 15 percent flagstones and 60 percent channers; common distinct lime casts on rock fragments; strongly effervescent; moderately alkaline (pH 8.2); clear wavy boundary.

R—14 inches; brown (10YR 4/3), hard, fractured shale.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the lithic contact (if it occurs at a depth of less than 12 inches)

*Depth to Bk horizon:* 5 to 10 inches

*Depth to bedrock:* 10 to 20 inches

*A horizon:*

Value—4 or 5 dry; 3 or 4 moist

Chroma—2 or 3

Clay content—15 to 27 percent

Content of rock fragments—35 to 45 percent (0 to 5 percent flagstones, 25 to 40 percent channers)

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 6.6 to 7.8

*Bw horizon:*

Value—5 or 6 dry

Chroma—3 or 4

Texture—loam or sandy loam

Clay content—15 to 27 percent

Content of rock fragments—35 to 60 percent (5 to 10 percent flagstones, 35 to 50 percent channers)

Calcium carbonate equivalent—0 to 10 percent

Reaction—pH 6.6 to 7.8

*Bk horizon:*

Value—5, 6, or 7 dry

Chroma—2, 3, or 4

Texture—loam or sandy loam

Clay content—15 to 27 percent

Content of rock fragments—50 to 80 percent (5 to 20 percent flagstones, 45 to 60 percent channers)

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.4 to 8.4

### Deville Series

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Somewhat excessively drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Escarpments, ridges, and side slopes of hills

*Parent material:* Residuum derived from hard, brown shale or argillite

*Slope range:* 4 to 70 percent

*Elevation range:* 4,400 to 6,500 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 95 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Lithic Haplustepts

### Typical Pedon

Deville very channery loam, in an area of Wilde-Deville-Vigilante complex, 8 to 35 percent slopes, in rangeland, 1,750 feet south and 825 feet west of the northeast corner of sec. 13, T. 2 N., R. 4 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) very channery loam, dark brown (10YR 3/3) moist; moderate fine granular structure; slightly hard,

very friable, nonsticky and nonplastic; many fine and very fine roots; 35 percent channers; neutral (pH 6.8); clear wavy boundary.

Bw1—4 to 7 inches; pale brown (10YR 6/3) very channery loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many fine and very fine roots; common fine and very fine pores; 5 percent flagstones and 35 percent channers; slightly alkaline (pH 7.4); clear wavy boundary.

Bw2—7 to 11 inches; brown (10YR 5/3) very channery loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common fine and very fine pores; 10 percent flagstones and 50 percent channers; slightly alkaline (pH 7.4); gradual wavy boundary.

BC—11 to 17 inches; brown (10YR 5/3) extremely channery sandy loam, brown (10YR 4/3) moist; weak fine granular structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots between channers; 15 percent flagstones and 65 percent channers; neutral (pH 7.0); clear wavy boundary.

R—17 inches; brown (10YR 5/3), hard, fractured shale.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the lithic contact (if it occurs at a depth of less than 12 inches)

*Depth to bedrock:* 10 to 20 inches

*Percent of surface covered by stones:* 0 to 3 percent

#### *A horizon:*

Value—4 or 5 dry; 3 or 4 moist

Chroma—2 or 3

Clay content—15 to 27 percent

Content of rock fragments—35 to 60 percent (0 to 5 percent flagstones, 35 to 55 percent channers)

Reaction—pH 6.6 to 7.3

#### *Bw horizon:*

Value—5 or 6 dry; 4 or 5 moist

Chroma—3 or 4

Texture—loam or sandy loam

Clay content—18 to 27 percent

Content of rock fragments—35 to 60 percent (5 to 10 percent flagstones, 30 to 50 percent channers)

Reaction—pH 6.6 to 7.8

#### *BC horizon:*

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—loam or sandy loam

Clay content—18 to 27 percent

Content of rock fragments—50 to 80 percent (5 to 15 percent flagstones, 45 to 65 percent channers)

Reaction—pH 6.6 to 7.3

### Dougcliff Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Very poorly drained

*Permeability:* Moderately rapid (2 to 6 inches per hour)

*Landform:* Depressional areas on flood plains and flood-plain steps and in drainageways

*Parent material:* Fibrous materials derived mainly from herbaceous vegetation over alluvium derived from mixed rock sources

*Slope range:* 0 to 1 percent

*Elevation range:* 4,400 to 6,500 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 95 days

**Taxonomic classification:** Euic Typic Haplofibrists

**Taxadjunct features:** The Dougcliff soils in this survey area are taxadjuncts because they have a mineral soil layer 12 or more inches thick with its upper boundary within 40 inches of the soil surface. These soils are classified as loamy, mixed, euic Terric Haplofibrists.

### Typical Pedon

Dougcliff mucky peat, 0 to 1 percent slopes, in rangeland, 450 feet east and 1,900 feet north of the southwest corner of sec. 16, T. 4 N., R. 4 W.

Oi—0 to 11 inches; mucky peat, very dark grayish brown (10YR 3/2) and dark brown (7.5YR 3/2) rubbed and pressed; about 80 percent fiber and raw herbaceous plant material, 70 percent rubbed; massive; nonsticky and nonplastic; neutral (pH 6.6); gradual wavy boundary.

Oe1—11 to 17 inches; mucky peat, very dark gray (10YR 3/1) and black (10YR 2/1) rubbed and pressed; about 90 percent fiber, 80 percent rubbed; massive; nonsticky and nonplastic; 90 percent herbaceous and 10 percent lycopodium mosses; slightly acid (pH 6.2); gradual wavy boundary.

Oe2—17 to 26 inches; mucky peat, very dark gray (10YR 3/1) and black (10YR 2/1) rubbed and pressed; about 85 percent fiber, 80 percent

rubbed; massive; nonsticky and nonplastic; slightly acid (pH 6.2); gradual wavy boundary.

C—26 to 60 inches; very dark gray (5Y 3/1) mucky silt loam, black (10YR 2/1) moist; massive; hard, firm, nonsticky and nonplastic; slightly alkaline (pH 7.6).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Water table:* At the surface to 6 inches below the surface

*Oi horizon:*

Hue—10YR or 7.5YR

Chroma—1 or 2

Fiber content—80 to 90 percent unrubbed; 65 to 75 percent rubbed

Reaction—pH 6.1 to 7.3

*Oe horizon:*

Hue—10YR or 5Y

Value—2 or 3 moist

Chroma—1 or 2

Fiber content—85 to 95 percent unrubbed; 75 to 85 percent rubbed

Reaction—pH 6.1 to 7.3

*C horizon:*

Hue—10YR, 2.5Y, or 5Y

Texture—mucky silt loam with stratifications of herbaceous material, sandy loam, or loam

Reaction—pH 6.1 to 7.8

## Eagleton Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Poorly drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Flood plains, flood-plain steps, and drainageways

*Parent material:* Alluvium derived from mixed rock sources

*Slope range:* 4 to 15 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Cumulic Endoaquolls

### Typical Pedon

Eagleton clay loam, in an area of Eagleton, stony-Kokoruda-Cometcrik complex, 2 to 25 percent slopes;

in a forested area, 950 feet north and 1,850 feet east of the southwest corner of sec. 4, T. 8 N., R. 4 W.

A1—0 to 6 inches; very dark grayish brown (10YR 3/2) clay loam, black (10YR 2/1) moist; moderate fine and very fine subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; many medium, fine, and very fine roots and few coarse roots; many very fine and fine pores; 5 percent rounded pebbles; slightly acid (pH 6.5); clear smooth boundary.

A2—6 to 15 inches; dark gray (10YR 4/1) clay loam; very dark gray (10YR 3/1) moist; moderate medium and coarse subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; many fine and very fine roots and common medium roots; many fine and very fine pores; 10 percent rounded pebbles; slightly acid (pH 6.5); gradual wavy boundary.

Bw—15 to 36 inches; grayish brown (10YR 5/2) sandy clay loam, very dark gray (10YR 3/1) moist; few fine faint yellowish brown (10YR 5/6) redox concentrations; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots and few medium roots; many fine and very fine pores; 10 percent rounded pebbles; slightly acid (pH 6.5); clear smooth boundary.

Cg1—36 to 50 inches; light gray (5Y 7/1) sandy clay loam, gray (5Y 5/1) moist; common fine faint dark yellowish brown (10YR 4/6) redox concentrations; few faint dark gray (5Y 4/1) redox depletions; massive; slightly hard, friable, slightly sticky and moderately plastic; common fine and very fine roots and few medium roots; many fine and very fine pores and few medium pores; 10 percent rounded pebbles; neutral (pH 6.7); gradual smooth boundary.

Cg2—50 to 60 inches; gray (5Y 6/1) sandy clay loam with thin stratifications of fine sandy loam and clay loam, dark gray (5Y 4/1) moist; many fine distinct yellowish red (5YR 5/6) redox concentrations; few faint dark gray (5Y 4/1) redox depletions; massive; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; many fine and very fine pores; 10 percent rounded pebbles; neutral (pH 7.0).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 24 to 60 inches  
*Depth to seasonal high water table:* 12 to 24 inches  
*Percent of surface covered by stones:* 0 to 0.1 percent

**A horizon:**

Value—3, 4, or 5 dry; 2 or 3 moist  
 Chroma—1 or 2  
 Clay content—27 to 35 percent  
 Content of rock fragments—0 to 15 percent pebbles  
 Reaction—pH 6.1 to 7.3

**Bw horizon:**

Hue—10YR, 2.5Y, or 5Y  
 Value—4 or 5 dry; 2 or 3 moist  
 Chroma—1 or 2  
 Texture—loam, clay loam, or sandy clay loam  
 Clay content—18 to 30 percent  
 Content of rock fragments—0 to 15 percent pebbles  
 Reaction—pH 6.1 to 7.8

**Cg horizon:**

Hue—5Y or N  
 Value—5, 6, or 7 dry; 4 or 5 moist  
 Texture—sandy clay loam with stratifications of sandy loam, silty clay, loam, and clay loam  
 Clay content—10 to 27 percent  
 Content of rock fragments—0 to 15 percent pebbles  
 Reaction—pH 6.6 to 7.8

**Ellena Series**

*Depth class:* Moderately deep (20 to 40 inches)  
*Drainage class:* Somewhat excessively drained  
*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Ridges and side slopes of mountains  
*Parent material:* Local colluvium, slope alluvium, and residuum derived from granite  
*Slope range:* 15 to 60 percent  
*Elevation range:* 5,500 to 7,000 feet  
*Annual precipitation:* 15 to 24 inches  
*Annual air temperature:* 36 to 40 degrees F  
*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Ustic Entrocrepts

**Typical Pedon**

Ellena very cobbly sandy loam, in an area of Kurrie, very bouldery-Ellena, very bouldery-Rock outcrop complex, 25 to 60 percent slopes; in a forested area, 350 feet north and 1,700 feet west of the southeast corner of sec. 18, T. 9 N., R. 3 W.

Oi—2 inches to 0; forest litter of partially decomposed needles, leaves, and twigs.

A—0 to 5 inches; grayish brown (10YR 5/2) very cobbly sandy loam, dark brown (10YR 3/3) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine, common fine, and few medium roots; many very fine and fine pores; 30 percent cobbles and 10 percent granite pebbles; neutral (pH 6.6); clear smooth boundary.

E—5 to 20 inches; light brownish gray (2.5Y 6/2) very cobbly coarse sandy loam, grayish brown (2.5Y 5/2) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine roots and few fine and medium roots; many very fine and fine pores; 5 percent stones, 25 percent cobbles, 10 percent granite pebbles; slightly acid (pH 6.4); clear wavy boundary.

E/Bw—20 to 33 inches; 85 percent light brownish gray (2.5Y 6/2) very cobbly coarse sandy loam, grayish brown (2.5Y 5/2) moist (E part); 15 percent light olive brown (2.5Y 5/4) very cobbly sandy clay loam, olive brown (2.5Y 4/4) moist (Bw part); moderate medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; many very fine roots and few fine and medium roots; many very fine and few fine pores; 5 percent stones, 35 percent cobbles, 10 percent granite pebbles; slightly acid (pH 6.3); clear wavy boundary.

Cr—33 to 36 inches; light brownish gray (2.5Y 6/2), decomposed granite bedrock (grus) that crushes to very gravelly coarse sand.

R—36 inches; hard granite bedrock.

**Range in Characteristics**

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches

*Depth to Cr horizon:* 20 to 38 inches

*Depth to R layer:* 23 to 40 inches

*Percent of surface covered by stones/boulders:* 0.1 to 3.0 percent

**A horizon:**

Hue—10YR or 2.5Y  
 Value—4, 5, or 6 dry; 3, 4, or 5 moist  
 Chroma—2, 3, or 4  
 Texture—coarse sandy loam or sandy loam  
 Clay content—10 to 20 percent  
 Content of rock fragments—10 to 60 percent (0 to 40 percent cobbles and stones, 10 to 30 percent pebbles)  
 Reaction—pH 6.1 to 7.3

*E horizon:*

Hue—10YR or 2.5Y  
 Value—6, 7, or 8 dry; 4, 5, or 6 moist  
 Chroma—1, 2, or 3  
 Texture—coarse sandy loam, sandy loam, or loam  
 Clay content—10 to 18 percent  
 Content of rock fragments—20 to 60 percent (0 to 45 percent cobbles and stones, 5 to 25 percent pebbles)  
 Reaction—pH 6.1 to 7.3

*E/Bw horizon:*

Hue—10YR or 2.5Y  
 Value—6, 7, or 8 dry, 4, 5, or 6 moist (E part); 4, 5, or 6 dry, 3, 4, or 5 moist (Bw part)  
 Chroma—1, 2, 3, or 4 (E part); 2, 3, or 4 (Bw part)  
 Texture (mixed)—coarse sandy loam or sandy loam  
 Clay content—10 to 18 percent  
 Content of rock fragments—35 to 60 percent (0 to 40 percent cobbles and stones, 10 to 30 percent pebbles)  
 Reaction—pH 6.1 to 7.3

**Elmark Series**

*Depth class:* Moderately deep (20 to 40 inches) to weathered granite bedrock and deep (40 to 60 inches) to hard granite bedrock

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, ridges, and side slopes of hills and mountains

*Parent material:* Local colluvium, alluvium, or residuum derived from granite

*Slope range:* 8 to 60 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 70 to 105 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Typic Haplustalfs

**Typical Pedon**

Elmark sandy clay loam, in an area of Elmark, bouldery-Lumpgulch, very bouldery-Rock outcrop complex, 8 to 35 percent slopes, dry; in a forested area, 1,250 feet north and 1,000 feet east of the southwest corner of sec. 20, T. 9 N., R. 2 W.

Oi—2 inches to 0; forest litter of partially decomposed needles, twigs, and leaves.

A—0 to 3 inches; dark grayish brown (10YR 4/2)

sandy clay loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium roots; many very fine and fine pores; 5 percent granite pebbles; neutral (pH 7.0); clear smooth boundary.

E—3 to 7 inches; light brownish gray (2.5Y 6/2) sandy clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots and few fine and medium roots; many very fine and few fine pores; 5 percent granite pebbles; slightly acid (pH 6.2); clear wavy boundary.

Bt—7 to 19 inches; light yellowish brown (2.5Y 6/4) gravelly sandy clay loam, olive brown (2.5Y 4/4) moist; weak medium prismatic structure parting to moderate medium and fine subangular blocky; slightly hard, friable, moderately sticky and slightly plastic; many very fine roots and few fine and medium roots; many very fine and few fine pores; many faint clay films bridging sand grains and on faces of peds; 20 percent granite pebbles; slightly acid (pH 6.2); gradual wavy boundary.

BC—19 to 30 inches; light olive brown (2.5Y 5/4) gravelly sandy loam, dark grayish brown (2.5Y 4/2) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common very fine and few fine roots; many very fine pores; 30 percent granite pebbles; slightly acid (pH 6.1); clear irregular boundary.

Cr—30 to 57 inches; olive (5Y 5/3), decomposed granite bedrock (grus) that crushes to very gravelly loamy coarse sand or gravelly coarse sand.

R—57 inches; hard granite bedrock.

**Range in Characteristics**

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bt horizon:* 5 to 17 inches

*Depth to Cr horizon:* 20 to 40 inches

*Depth to R layer:* 40 to 60 inches

*Percent of surface covered by stones/boulders:* 0 to 3 percent

*A horizon:*

Hue—10YR or 2.5Y

Value—3, 4, or 5 dry; 2, 3, or 4 moist

Chroma—1, 2, or 3

Texture—coarse sandy loam, sandy loam, sandy clay loam, or loam

Clay content—8 to 25 percent  
 Content of rock fragments—0 to 50 percent (0 to 20 percent cobbles, 5 to 30 percent pebbles)  
 Reaction—pH 6.1 to 7.3

*E horizon:*

Hue—10YR or 2.5Y  
 Value—5 or 6 dry; 4 or 5 moist  
 Chroma—2 or 3  
 Texture—coarse sandy loam, sandy loam, or sandy clay loam  
 Clay content—10 to 25 percent  
 Content of rock fragments—5 to 25 percent pebbles  
 Reaction—pH 5.6 to 7.3

*Bt horizon:*

Hue—10YR or 2.5Y  
 Value—5 or 6 dry; 4 or 5 moist  
 Chroma—2, 3, or 4  
 Texture—sandy clay loam or clay loam  
 Clay content—20 to 30 percent  
 Content of rock fragments—5 to 25 percent pebbles  
 Reaction—pH 6.1 to 7.3

*BC horizon:*

Hue—10YR, 2.5Y, or 5Y  
 Value—5 or 6 dry; 4 or 5 moist  
 Chroma—2, 3, or 4  
 Texture—coarse sandy loam or sandy loam  
 Clay content—10 to 18 percent  
 Content of rock fragments—15 to 35 percent pebbles  
 Reaction—pH 6.1 to 7.3

**Elve Series**

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Somewhat excessively drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Alluvial fans, mountain valleys, and sides of mountains

*Parent material:* Colluvium and alluvium derived mainly from fine grained igneous rocks

*Slope range:* 2 to 70 percent slopes

*Elevation range:* 5,500 to 8,000 feet

*Annual precipitation:* 15 to 30 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 30 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Ustic Eutrocryepts

**Typical Pedon**

Elve very cobbly loam, in an area of Elve, very stony-Cowood, rubbly-Rock outcrop complex, 35 to 60 percent slopes, dry; in a forested area, 50 feet west and 1,500 feet south of the northeast corner of sec. 11, T. 4 N., R. 4 W.

Oi—1 inch to 0; forest litter of partially decomposed needles, twigs, and cones.

A1—0 to 2 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many medium and coarse roots; many fine and very fine pores; 20 percent angular cobbles and 20 percent angular pebbles; moderately acid (pH 5.8); clear wavy boundary.

A2—2 to 5 inches; brown (10YR 5/3) very cobbly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many medium and coarse roots; many fine and very fine pores; 25 percent angular cobbles and 20 percent angular pebbles; moderately acid (pH 5.8); clear wavy boundary.

E—5 to 11 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 5/3) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine, medium, and coarse roots; many fine and very fine pores; 15 percent angular cobbles and 45 percent angular pebbles; slightly acid (pH 6.2); gradual wavy boundary.

Bw—11 to 18 inches; light brownish gray (10YR 6/2) very gravelly loam, brown (10YR 5/3) moist; moderate medium prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; common fine, medium, and coarse roots; many fine and very fine pores; 15 percent angular cobbles and 40 percent angular pebbles; slightly acid (pH 6.3); gradual wavy boundary.

BC—18 to 32 inches; pale brown (10YR 6/3) very gravelly coarse sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; common fine, medium, and coarse roots; many fine and very fine pores; 20 percent angular cobbles and 45 percent angular pebbles; slightly acid (pH 6.3); gradual wavy boundary.

C—32 to 60 inches; light yellowish brown (10YR 6/4) extremely gravelly coarse sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine and

very fine roots; common fine pores; 25 percent angular cobbles and 40 percent angular pebbles; slightly acid (pH 6.3).

### Range in Characteristics

*Soil temperature:* 36 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Percent of surface covered by stones/boulders:* 0 to 20 percent

*A horizon:*

Value—4, 5, or 6 dry; 2, 3, or 4 moist

Chroma—2, 3, or 4

Texture—sandy loam or loam

Clay content—10 to 27 percent

Content of rock fragments—5 to 60 percent (0 to 30 percent cobbles and stones, 5 to 30 percent pebbles)

Reaction—pH 5.1 to 6.5

*E horizon:*

Value—6 or 7 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—loam or sandy loam

Clay content—10 to 20 percent

Content of rock fragments—35 to 85 percent (0 to 25 percent stones, 10 to 40 percent cobbles, 20 to 45 percent pebbles)

Reaction—pH 5.1 to 6.5

*Bw horizon:*

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—loam, coarse sandy loam, or sandy loam

Clay content—10 to 20 percent

Content of rock fragments—60 to 85 percent (15 to 40 percent cobbles and stones, 25 to 45 percent pebbles)

Reaction—pH 5.1 to 6.5

*BC and C horizons:*

Value—6 or 7 dry; 4 or 5 moist

Chroma—3, 4, or 6

Texture—coarse sandy loam, sandy loam, or loam

Clay content—10 to 20 percent

Content of rock fragments—60 to 85 percent (20 to 40 percent cobbles and stones, 35 to 45 percent pebbles)

Reaction—pH 5.1 to 6.5

### Elvick Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Somewhat poorly drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans; drainageways in mountains

*Parent material:* Alluvium derived from granite and hard, fine grained igneous rock

*Slope range:* 1 to 25 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Oxyaquic Eutrocryepts

### Typical Pedon

Elvick very cobbly loam, in an area of Elvick-Lowder complex, 8 to 25 percent slopes, very bouldery; in a forested area, 950 feet south and 2,500 feet east of the northwest corner of sec. 6, T. 3 N., R. 3 W.

Oi—2 inches to 0; forest litter of partially decomposed needles, leaves, and twigs.

A—0 to 1 inch; dark grayish brown (10YR 4/2) very cobbly loam, very dark brown (10YR 2/2) moist; weak medium granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; many very fine and fine pores; 20 percent cobbles and 15 percent pebbles; slightly acid (pH 6.4); clear wavy boundary.

E1—1 to 7 inches; light brownish gray (10YR 6/2) very cobbly loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; many very fine and fine pores; 25 percent cobbles and 20 percent pebbles; slightly acid (pH 6.2); gradual wavy boundary.

E2—7 to 18 inches; light brownish gray (10YR 6/2) very cobbly loam, grayish brown (10YR 5/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots and few medium and coarse roots; many very fine and fine pores; 30 percent cobbles and 20 percent pebbles; slightly acid (pH 6.2); gradual wavy boundary.

E/Bw—18 to 26 inches; 80 percent light brownish gray (10YR 6/2) very cobbly coarse sandy loam, brown (10YR 5/3) moist (E part); 20 percent pale brown (10YR 6/3) very cobbly coarse sandy loam, brown (10YR 4/3) moist (Bw part); moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common

very fine, fine, and medium roots; many very fine and fine pores; 30 percent cobbles and 25 percent pebbles; slightly acid (pH 6.3); gradual wavy boundary.

Bw—26 to 38 inches; pale brown (10YR 6/3) very cobbly coarse sandy loam, brown (10YR 4/3) moist; common fine distinct strong brown (7.5YR 5/6) redox concentrations; moderate medium subangular blocky structure; hard, firm, slightly sticky and nonplastic; common very fine, fine, and medium roots; many very fine and fine pores; 30 percent cobbles and 25 percent pebbles; slightly acid (pH 6.4); gradual wavy boundary.

BC—38 to 60 inches; light yellowish brown (10YR 6/4) extremely cobbly coarse sandy loam, dark yellowish brown (10YR 4/4) moist; common fine distinct strong brown (7.5YR 5/6) redox concentrations; moderate fine and medium subangular blocky structure; hard, firm, slightly sticky and nonplastic; few very fine, fine, and medium roots; common very fine and fine pores; 40 percent cobbles and 25 percent pebbles; slightly acid (pH 6.4).

### Range in Characteristics

*Soil temperature:* 36 to 42 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches

*Depth to the water table:* 24 to 42 inches from May through July

*Percent of surface covered by stones/boulders:* 0 to 15 percent

#### *A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry

Chroma—2 or 3

Clay content—18 to 27 percent

Content of rock fragments—0 to 65 percent (0 to 20 percent stones and boulders, 20 to 30 percent cobbles, 10 to 25 percent pebbles)

Reaction—pH 6.1 to 6.5

#### *E horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—loam or coarse sandy loam

Clay content—15 to 25 percent

Content of rock fragments—0 to 65 percent (0 to 20 percent stones and boulders, 20 to 30 percent cobbles, 15 to 25 percent pebbles)

Reaction—pH 6.1 to 6.5

#### *E/Bw horizon:*

Value—6 or 7 dry, 5 or 6 moist (E part); 5 or 6 dry, 4 or 5 moist (Bw part)

Chroma—2 or 3

Texture—coarse sandy loam or sandy loam

Clay content—10 to 18 percent

Content of rock fragments—35 to 75 percent (0 to 20 percent stones, 20 to 30 percent cobbles, 10 to 25 percent pebbles)

Reaction—pH 6.1 to 6.5

#### *Bw horizon:*

Value—5 or 6 dry; 4 or 5 moist

Chroma—2 or 3

Texture—coarse sandy loam or sandy loam

Clay content—10 to 18 percent

Content of rock fragments—35 to 75 percent (0 to 20 percent stones, 20 to 30 percent cobbles, 10 to 25 percent pebbles)

Reaction—pH 6.1 to 6.5

#### *BC horizon:*

Value—5 or 6 dry

Chroma—3, 4, or 5

Texture—coarse sandy loam or sandy loam

Clay content—8 to 15 percent

Content of rock fragments—35 to 75 percent (0 to 25 percent stones, 20 to 40 percent cobbles, 15 to 30 percent pebbles)

Reaction—pH 6.1 to 6.5

## Ethridge Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Slow (0.06 to 0.2 inch per hour)

*Landform:* Alluvial fans, stream terraces, escarpments, and side slopes of hills

*Parent material:* Alluvium derived mainly from semiconsolidated shale

*Slope range:* 0 to 70 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine, smectitic, frigid  
Torrertic Argiustolls

### Typical Pedon

Ethridge clay loam, 2 to 8 percent slopes, in rangeland, 1,450 feet east and 2,300 feet south of the northwest corner of sec. 27, T. 2 N., R. 1 W.

**Ap**—0 to 5 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, friable, moderately sticky and moderately plastic; many very fine and fine roots; 5 percent rounded pebbles; slightly alkaline (pH 7.8); abrupt smooth boundary.

**Bt**—5 to 13 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to strong fine and very fine subangular blocky; hard, firm, moderately sticky and very plastic; many very fine and fine roots; many fine and very fine pores; common faint very dark grayish brown (10YR 3/2) clay films on faces of peds; 5 percent rounded pebbles; slightly alkaline (pH 7.8); clear wavy boundary.

**Bk**—13 to 26 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 5/3) moist; moderate coarse prismatic structure; hard, friable, moderately sticky and moderately plastic; many very fine and fine roots; many fine and very fine pores; disseminated lime, common fine threads and masses of lime; violently effervescent; moderately alkaline (pH 8.4); gradual irregular boundary.

**Bky**—26 to 60 inches; pale brown (10YR 6/3) loam with thin layers of silt loam and silty clay, brown (10YR 5/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine pores; disseminated lime, common fine threads and masses of lime; few fine nests and seams of gypsum; strongly effervescent; moderately alkaline (pH 8.4).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 14 inches

*Depth to Bk horizon:* 10 to 20 inches

*Ap horizon:*

Value—2 or 3 moist

Chroma—2 or 3

Texture—clay loam or loam

Clay content—20 to 35 percent

Content of rock fragments—0 to 5 percent pebbles

Reaction—pH 6.6 to 8.4; pH 7.4 to 8.4 in the saline phase

Electrical conductivity—4 to 16 mmhos/cm (saline phase)

Sodium adsorption ratio—0 to 4 (saline phase)

*Bt horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 3 or 4 moist

Chroma—2, 3, or 4

Texture—clay, silty clay, clay loam, or silty clay loam

Clay content—35 to 45 percent

Content of rock fragments—0 to 5 percent pebbles

Reaction—pH 6.6 to 8.4; pH 7.4 to 9.0 in the saline phase

*Bk and Bky horizons:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—clay, silty clay loam, loam, clay loam, or silty clay

Clay content—20 to 45 percent

Content of rock fragments—0 to 5 percent pebbles

Calcium carbonate equivalent—5 to 15 percent

Electrical conductivity—0 to 4 mmhos/cm; 8 to 16 mmhos/cm in the saline phase

Content of gypsum—0 to 3 percent; 1 to 3 percent in the saline phase

Reaction—pH 7.4 to 9.0; pH 7.4 to 9.0 in the saline phase

### Fairway Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Somewhat poorly drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Flood plains, flood-plain steps, and stream terraces

*Parent material:* Alluvium derived from mixed rock sources

*Slope range:* 0 to 2 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Fluvaquentic Haplustolls

### Typical Pedon

Fairway clay loam, 0 to 2 percent slopes, in cropland, 1,575 feet north and 2,550 feet west of the southeast corner of sec. 35, T. 2 N., R. 5 W.

**Ap**—0 to 7 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10Y 3/2) moist;

moderate fine granular structure; slightly hard, friable, moderately sticky and slightly plastic; common very fine roots; disseminated lime; slightly effervescent; slightly alkaline (pH 7.8); clear smooth boundary.

A—7 to 13 inches; dark grayish brown (10YR 4/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; many very fine and fine roots; common very fine pores; disseminated lime; slightly effervescent; slightly alkaline (pH 7.8); clear wavy boundary.

Bk—13 to 25 inches; brown (10YR 5/3) silt loam, brown (10YR 4/3) moist; few fine distinct dark reddish brown (5YR 3/4) redox concentrations; weak medium prismatic structure parting to weak coarse subangular blocky; hard, friable, moderately sticky and slightly plastic; many very fine and fine roots; common very fine pores; disseminated lime, few fine seams and masses of lime; strongly effervescent; moderately alkaline (pH 7.9); clear smooth boundary.

Bg—25 to 40 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; common or many fine distinct dark reddish brown (5YR 3/4) redox concentrations; massive; hard, friable, moderately sticky and moderately plastic; disseminated lime; slightly effervescent; slightly alkaline (pH 7.6); clear smooth boundary.

Cg—40 to 60 inches; dark grayish brown (10YR 4/2) silt loam with strata of fine sand, silty clay loam, and coarse sandy loam, very dark grayish brown (10YR 3/2) moist; many fine and medium prominent yellowish red (5YR 4/6) (moist) redox concentrations; massive; slightly hard, very friable, slightly sticky and nonplastic; common very fine and fine roots; neutral (pH 7.3).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Thickness of the mollic epipedon:* 10 to 15 inches

*Depth to seasonal high water table:* 24 to 42 inches

#### A horizon:

Value—4 or 5 dry; 2 or 3 moist

Chroma—1 or 2

Texture—loam, silt loam, or clay loam

Clay content—15 to 35 percent

Calcium carbonate equivalent—2 to 5 percent

Reaction—pH 6.6 to 8.4

#### Bk horizon:

Hue—10YR or 2.5Y

Value—5 or 6 dry; 3 or 4 moist

Chroma—2 or 3

Texture—loam, silt loam, or clay loam

Clay content—18 to 35 percent

Content of rock fragments—0 to 10 percent pebbles

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.4 to 8.4

#### Bg horizon:

Hue—10YR or 2.5Y

Value—5 or 6 dry; 3 or 4 moist

Chroma—1, 2, or 3

Texture—loam, silt loam, or silty clay loam; some thin strata of sandy loam, loamy sand, and clay loam

Clay content—18 to 30 percent

Content of rock fragments—0 to 10 percent pebbles

Calcium carbonate equivalent—2 to 10 percent

Reaction—pH 7.4 to 8.4

#### Cg horizon:

Hue—10YR, 2.5Y, or 5Y

Value—4, 5, or 6 dry; 3 or 4 moist

Chroma—1 or 2

Texture—silt loam with strata of fine sand, silty clay loam, and coarse sandy loam

Clay content—10 to 22 percent

Content of rock fragments—0 to 20 percent pebbles

Calcium carbonate equivalent—0 to 10 percent

Reaction—pH 6.6 to 7.8

## Faith Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Moderately well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Flood-plain steps, drainageways, alluvial fans, and stream terraces

*Parent material:* Alluvium derived mainly from mixed rock sources

*Slope range:* 0 to 8 percent

*Elevation range:* 3,800 to 5,500 feet

*Annual precipitation:* 10 to 17 inches

*Annual air temperature:* 36 to 44 degrees F

*Frost-free period:* 80 to 115 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Torrifluventic Haplustolls

## Typical Pedon

Faith loam, 0 to 2 percent slopes, in pasture, 1,375

feet south and 75 feet west of the northeast corner of sec. 3, T. 1 N., R. 4 W.

Ap1—0 to 4 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; slightly alkaline (pH 7.4); clear smooth boundary.

Ap2—4 to 8 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; disseminated lime; slightly effervescent; slightly alkaline (pH 7.8); clear wavy boundary.

Bw—8 to 14 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist; strong medium prismatic structure parting to moderate medium subangular blocky; slightly hard, firm, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; disseminated lime; slightly effervescent; moderately alkaline (pH 8.2); gradual wavy boundary.

Bk—14 to 31 inches; light brownish gray (10YR 6/2) silty clay loam, grayish brown (10YR 5/2) moist; strong coarse prismatic structure parting to strong medium subangular blocky; slightly hard, firm, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; disseminated lime, few very fine threads of lime; strongly effervescent; moderately alkaline (pH 8.3); clear smooth boundary.

2C—31 to 47 inches; light brownish gray (2.5Y 6/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; moderately alkaline (pH 8.2); clear smooth boundary.

2Cg1—47 to 56 inches; grayish brown (2.5Y 5/2) silt loam, dark grayish brown (2.5Y 4/2) moist; common distinct yellowish red (5YR 5/6) redox concentrations; massive; slightly hard, very friable, slightly sticky and nonplastic; few very fine roots; moderately alkaline (pH 8.2); clear smooth boundary.

2Cg2—56 to 60 inches; light olive gray (5Y 6/2) loam, olive gray (5Y 4/2) moist; common faint very dark gray (5Y 3/1) redox depletions; common faint yellowish red (5YR 5/6) redox concentrations; massive; slightly hard, very friable, slightly sticky and nonplastic; moderately alkaline (pH 8.2).

### Range in Characteristics

*Soil temperature:* 38 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 15 inches

*Depth to the water table:* 42 to 60 inches for extended periods during spring and early summer

#### *Ap horizon:*

Hue—10YR or 2.5Y

Chroma—2 or 3

Texture—loam or sandy loam; layers containing varying amounts of heavy metals from mining leach and settling ponds in the impacted phase

Clay content—15 to 27 percent

Content of rock fragments—0 to 10 percent pebbles

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 6.6 to 7.8; pH 5.1 to 6.5 in the impacted phase

#### *Bw horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2 or 3

Texture—loam, silt loam, or silty clay loam with thin strata of finer and coarser materials

Clay content—18 to 30 percent

Content of rock fragments—0 to 10 percent pebbles

Calcium carbonate equivalent—0 to 10 percent

Reaction—pH 7.4 to 8.4

#### *Bk horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—loam, silt loam, silty clay loam, or clay loam with thin strata of finer and coarser materials

Clay content—18 to 30 percent

Content of rock fragments—0 to 10 percent pebbles

Electrical conductivity—0 to 2 mmhos/cm

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.4 to 8.4

#### *2C horizon:*

Hue—10YR, 2.5Y, or 5Y

Value—4, 5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—1, 2, or 3

Texture—fine sandy loam, loam, silt loam, or very fine sandy loam

Clay content—12 to 27 percent with 15 percent or more fine sand or coarser

Content of rock fragments—0 to 15 percent pebbles  
 Electrical conductivity—0 to 4 mmhos/cm  
 Calcium carbonate equivalent—1 to 15 percent  
 Reaction—pH 7.4 to 8.4

## Farnuf Series

*Depth class:* Very deep (greater than 60 inches)  
*Drainage class:* Well drained  
*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)  
*Landform:* Stream terraces, alluvial fans, and side slopes of hills  
*Parent material:* Alluvium derived mainly from mixed rock sources  
*Slope range:* 2 to 35 percent  
*Elevation range:* 4,400 to 6,000 feet  
*Annual precipitation:* 15 to 19 inches  
*Annual air temperature:* 36 to 40 degrees F  
*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Typic Argiustolls

### Typical Pedon

Farnuf sandy loam, 2 to 8 percent slopes, in rangeland, 650 feet west and 2,450 feet north of the southeast corner of sec. 5, T. 5 N., R. 4 W.

A—0 to 7 inches; grayish brown (10YR 5/2) sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, and medium roots; 5 percent rounded pebbles; neutral (pH 6.7); clear smooth boundary.

Bt—7 to 14 inches; dark yellowish brown (10YR 4/4) gravelly sandy clay loam, brown (10YR 4/3) moist; strong medium prismatic structure parting to strong fine and medium subangular blocky; hard, friable, moderately sticky and slightly plastic; many very fine and fine roots and common medium roots; many fine and very fine pores; continuous faint dark grayish brown (10YR 4/2) clay films on faces of peds; 20 percent rounded pebbles; slightly alkaline (pH 7.4); clear wavy boundary.

Bk1—14 to 23 inches; light yellowish brown (10YR 6/4) gravelly loam, yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; many fine and very fine roots; many fine and very fine pores; 30 percent rounded pebbles; disseminated lime, few fine masses and

threads of lime; strongly effervescent; moderately alkaline (pH 8.4); clear smooth boundary.  
 Bk2—23 to 32 inches; very pale brown (10YR 7/3) gravelly loam, light yellowish brown (10YR 6/4) moist; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; common fine and very fine pores; 30 percent pebbles; disseminated lime, common fine threads and masses of lime, continuous faint coatings of lime on pebbles; strongly effervescent; moderately alkaline (pH 8.2); clear wavy boundary.  
 BC—32 to 60 inches; very pale brown (10YR 7/4) gravelly sandy clay loam consisting of stratified sandy clay loam, loam, and fine sandy loam, yellowish brown (10YR 5/4) moist; massive; hard, very friable, moderately sticky and slightly plastic; few fine and very fine roots; common fine and very fine pores; 30 percent pebbles; disseminated lime; strongly effervescent; strongly alkaline (pH 8.5).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F  
*Moisture control section:* Between the depths of 4 and 12 inches  
*Thickness of the mollic epipedon:* 7 to 15 inches  
*Depth to Bt horizon:* 6 to 11 inches  
*Depth to Bk horizon:* 10 to 25 inches  
*Percent of surface covered by stones:* 0 to 0.1 percent

*A horizon:*  
 Hue—2.5Y or 10YR  
 Value—3, 4, or 5 dry; 2 or 3 moist  
 Chroma—2 or 3  
 Texture—loam, sandy clay loam, or sandy loam  
 Clay content—15 to 27 percent  
 Content of rock fragments—0 to 35 percent (0 to 20 percent cobbles and stones, 0 to 15 percent pebbles)  
 Reaction—pH 6.6 to 7.3

*Bt horizon:*  
 Hue—2.5Y or 10YR  
 Value—3, 4, 5, or 6 dry; 2, 3, or 4 moist  
 Chroma—2, 3, or 4  
 Texture—loam, clay loam, or sandy clay loam  
 Clay content—20 to 35 percent  
 Content of rock fragments—5 to 35 percent pebbles  
 Reaction—pH 6.6 to 7.8

*Bk horizon:*  
 Hue—2.5Y or 10YR  
 Value—5, 6, or 7 dry; 4, 5, or 6 moist  
 Chroma—2, 3, or 4

Texture—fine sandy loam, loam, silt loam, or sandy clay loam  
 Clay content—12 to 27 percent  
 Content of rock fragments—10 to 35 percent pebbles  
 Calcium carbonate equivalent—5 to 15 percent  
 Reaction—pH 7.4 to 8.4

**BC horizon:**

Hue—2.5Y or 10YR  
 Value—5, 6, or 7 dry; 4, 5, or 6 moist  
 Chroma—2, 3, or 4  
 Texture—loam or sandy clay loam consisting of strata of fine sandy loam, clay loam, sandy clay loam, loam, or silt loam  
 Clay content—12 to 27 percent  
 Content of rock fragments—10 to 35 percent (0 to 5 percent cobbles, 10 to 30 percent pebbles)  
 Calcium carbonate equivalent—3 to 10 percent  
 Reaction—pH 7.4 to 9.0

**Ferball Series**

*Depth class:* Very deep (greater than 60 inches)  
*Drainage class:* Well drained  
*Permeability:* Moderately slow (0.2 to 0.6 inch per hour)  
*Landform:* Alluvial fans and side slopes of hills  
*Parent material:* Alluvium derived from red shale bedrock  
*Slope range:* 2 to 8 percent  
*Elevation range:* 4,000 to 6,000 feet  
*Annual precipitation:* 10 to 16 inches  
*Annual air temperature:* 40 to 44 degrees F  
*Frost-free period:* 85 to 115 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Aridic Haplustalfs

**Typical Pedon**

Ferball clay loam, 2 to 8 percent slopes, in rangeland, 200 feet south and 2,900 feet west of the northeast corner of sec. 27, T. 2 N., R. 3 W.

A—0 to 5 inches; yellowish red (5YR 4/6) clay loam, reddish brown (5YR 4/4) moist; strong fine blocky structure; slightly hard, friable, moderately sticky and slightly plastic; many very fine and few fine roots; many very fine and fine pores; disseminated lime; slightly effervescent; moderately alkaline (pH 8.0); clear smooth boundary.

Btk—5 to 12 inches; red (2.5YR 5/6) clay loam, red (2.5YR 4/6) moist; strong medium prismatic structure; hard, firm, moderately sticky and slightly plastic; many very fine and few fine roots; many

very fine pores; many faint clay films on faces of peds; disseminated lime, few fine masses of lime; strongly effervescent; moderately alkaline (pH 8.0); gradual wavy boundary.

Bk1—12 to 45 inches; red (2.5YR 5/6) clay loam, red (2.5YR 4/6) moist; moderate fine subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; common very fine and few fine roots; many very fine pores; disseminated lime, few fine masses of lime; violently effervescent; moderately alkaline (pH 8.4); gradual wavy boundary.

Bk2—45 to 60 inches; red (2.5YR 5/6) silty clay loam, red (2.5YR 4/6) moist; weak fine subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; few very fine roots; common very fine tubular pores; disseminated lime, few fine masses of lime; violently effervescent; moderately alkaline (pH 8.3).

**Range in Characteristics**

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bt horizon:* 3 to 5 inches

*Depth to Bk horizon:* 10 to 15 inches

**A horizon:**

Hue—5YR or 7.5YR  
 Value—4 or 5 dry; 3 or 4 moist  
 Chroma—3, 4, or 6  
 Clay content—27 to 30 percent  
 Content of rock fragments—0 to 15 percent pebbles  
 Calcium carbonate equivalent—0 to 5 percent  
 Reaction—pH 7.9 to 8.4

**Btk horizon:**

Hue—2.5YR or 5YR  
 Value—5 or 6 dry; 4 or 5 moist  
 Chroma—4, 6, or 8  
 Texture—loam, clay loam, or silty clay loam  
 Clay content—25 to 35 percent  
 Content of rock fragments—0 to 15 percent pebbles  
 Calcium carbonate equivalent—5 to 10 percent  
 Reaction—pH 7.9 to 8.4

**Bk horizon:**

Hue—2.5YR or 5YR  
 Value—5 or 6 dry; 4 or 5 moist  
 Chroma—4, 6, or 8  
 Texture—loam, clay loam, or silty clay loam  
 Clay content—20 to 30 percent  
 Content of rock fragments—0 to 15 percent pebbles

Calcium carbonate equivalent—5 to 15 percent  
Reaction—pH 7.9 to 8.4

## Firada Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Upper side slopes and ridges of mountains

*Parent material:* Local colluvium, alluvium, and residuum derived from limestone

*Slope range:* 4 to 45 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Typic Eutrocryepts

**Taxadjunct features:** The Firada soils in this survey area are taxadjuncts because they have a higher content of lime than is defined as the range for the series. These soils are classified as loamy-skeletal, carbonatic Typic Eutrocryepts.

### Typical Pedon

Firada very gravelly loam, in an area of Whitore, stony-Helmville, bouldery-Firada, very stony, complex, 15 to 45 percent slopes; in a forested area, 2,550 feet east and 1,650 feet south of the northwest corner of sec. 11, T. 5 N., R. 2 E.

Oi— $\frac{1}{2}$  inch to 0; forest litter of partially decomposed needles, leaves, and twigs.

A—0 to 4 inches; dark grayish brown (10YR 4/2) very gravelly loam, dark brown (10YR 3/3) moist; moderate medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots and common medium roots; 5 percent angular cobbles and 35 percent angular pebbles; disseminated lime, common faint lime coatings on undersides of fragments; slightly effervescent; slightly alkaline (pH 7.6); clear wavy boundary.

Bw—4 to 9 inches; pale brown (10YR 6/3) very cobbly loam, brown (10YR 5/3) moist; moderate medium prismatic structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots and common medium roots; many very fine and fine pores; 25 percent angular cobbles and 20 percent angular pebbles; disseminated lime, common faint lime coatings on undersides of fragments; strongly effervescent; slightly alkaline (pH 7.8); clear wavy boundary.

Bk1—9 to 17 inches; very pale brown (10YR 7/3) very

cobbly loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots and common medium roots; many very fine and fine pores; 30 percent angular cobbles and 20 percent angular pebbles; disseminated lime, common distinct lime casts on sides and bottoms of fragments; violently effervescent; moderately alkaline (pH 8.3); gradual wavy boundary.

Bk2—17 to 36 inches; light gray (10YR 7/2) very cobbly loam, light brownish gray (10YR 6/2) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; common very fine, fine, and medium roots; many very fine and fine pores; 30 percent angular cobbles and 30 percent angular pebbles; disseminated lime, common distinct lime casts around fragments; violently effervescent; moderately alkaline (pH 8.3).

R—36 inches; hard, fractured, light gray (10YR 7/2) limestone.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bk horizon:* 7 to 25 inches

*Depth to bedrock:* 20 to 40 inches

*Percent of surface covered by stones:* 0.01 to 3.0 percent

#### A horizon:

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2 or 3

Clay content—15 to 25 percent

Content of rock fragments—15 to 50 percent (0 to 15 percent angular cobbles, 15 to 35 percent angular pebbles)

Calcium carbonate equivalent—5 to 10 percent  
Reaction—pH 7.4 to 8.4

#### Bw horizon:

Value—5 or 6 dry; 4 or 5 moist

Chroma—2 or 3

Clay content—15 to 25 percent

Content of rock fragments—30 to 60 percent (15 to 30 percent angular cobbles, 15 to 30 percent angular pebbles)

Calcium carbonate equivalent—5 to 15 percent  
Reaction—pH 7.4 to 8.4

#### Bk horizon:

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2 or 3

Clay content—15 to 25 percent

Content of rock fragments—35 to 60 percent (20 to 30 percent angular cobbles, 20 to 30 percent angular pebbles)

Calcium carbonate equivalent—40 to 60 percent  
Reaction—pH 7.9 to 8.4

## Floweree Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Stream terraces, alluvial fans, and knolls

*Parent material:* Alluvium derived mainly from semiconsolidated sedimentary beds; eolian deposits

*Slope range:* 0 to 15 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine-silty, mixed, superactive, frigid Aridic Haplustolls

### Typical Pedon

Floweree silt loam, 2 to 8 percent slopes, in cropland, 2,100 feet north and 575 feet west of the southeast corner of sec. 34, T. 2 N., R. 1 W.

Ap—0 to 7 inches; grayish brown (2.5Y 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate fine and very fine granular structure; hard, friable, slightly sticky and slightly plastic; many very fine roots; neutral (pH 7.0); abrupt smooth boundary.

Bw1—7 to 11 inches; grayish brown (10YR 5/2) silt loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine pores; neutral (pH 7.0); clear smooth boundary.

Bw2—11 to 16 inches; brown (10YR 5/3) silt loam, brown (10YR 4/3) moist; moderate medium prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine pores; slightly effervescent; slightly alkaline (pH 7.4); clear wavy boundary.

Bk1—16 to 34 inches; light gray (10YR 7/2) silt loam, pale brown (10YR 6/3) moist; moderate medium and coarse prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine pores;

disseminated lime, few fine threads and masses of lime; violently effervescent; moderately alkaline (pH 8.2); gradual smooth boundary.

Bk2—34 to 42 inches; light gray (10YR 7/2) loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine pores; disseminated lime, common fine threads and masses of lime; violently effervescent; moderately alkaline (pH 8.2); gradual wavy boundary.

Bk3—42 to 60 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; common very fine and fine roots; common very fine pores; disseminated lime, few fine threads and masses of lime; strongly effervescent; moderately alkaline (pH 8.0).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 13 inches

*Depth to Bk horizon:* 11 to 20 inches

*Ap horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 2 or 3 moist

Chroma—2 or 3

Clay content—15 to 25 percent

Reaction—pH 6.6 to 7.8

*Bw horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2 or 3

Clay content—12 to 22 percent

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 6.6 to 7.8

*Bk horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Clay content—12 to 25 percent

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.9 to 8.4

## Foolhen Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Very poorly drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Flood plains and flood-plain steps in mountains

*Parent material:* Alluvium derived from mixed rock sources

*Slope range:* 0 to 4 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Fine-loamy, mixed, superactive Typic Cryaquolls

### Typical Pedon

Foolhen mucky loam, in an area of Foolhen, stony-Tibkey, bouldery, complex, 0 to 8 percent slopes, in a wet meadow, 1,100 feet west and 2,225 feet south of the northeast corner of sec. 6, T. 3 N., R. 3 W.

Oe—1 inch to 0; mat of partially decomposed organic material and roots.

A1—0 to 4 inches; black (5Y 2.5/2) mucky loam, black (10YR 2/1) moist; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots and common medium roots; 5 percent rounded cobbles and 10 percent rounded pebbles; neutral (pH 6.8); clear wavy boundary.

A2—4 to 13 inches; black (5Y 2.5/2) mucky silt loam, black (10YR 2/1) moist; few distinct reddish brown (5YR 5/4) redox concentrations; moderate medium prismatic structure parting to moderate fine subangular blocky; hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine pores; 5 percent rounded cobbles and 20 percent rounded pebbles; neutral (pH 6.8); gradual wavy boundary.

Bw—13 to 21 inches; pale brown (10YR 6/3) gravelly sandy clay loam, dark brown (10YR 3/3) moist; many distinct yellowish red (5YR 5/6) redox concentrations; common faint very dark gray (5Y 3/1) redox depletions; moderate medium subangular blocky structure; hard, friable, moderately sticky and slightly plastic; many very fine and fine roots; few very fine pores; 5 percent rounded cobbles and 20 percent rounded pebbles; neutral (pH 7.0); gradual wavy boundary.

Cg1—21 to 32 inches; brown (10YR 5/3) gravelly sandy clay loam, brown (10YR 4/3) moist; many distinct yellowish red (5YR 5/6) redox concentrations; common faint very dark gray (5Y 3/1) redox depletions; weak medium subangular blocky structure; hard, friable, moderately sticky and slightly plastic; many very fine and fine roots; few very fine pores; 5 percent rounded cobbles

and 20 percent rounded pebbles; neutral (pH 7.2); gradual wavy boundary.

Cg2—32 to 44 inches; yellowish brown (10YR 5/4) cobbly sandy clay loam, brown (10YR 4/3) moist; many distinct yellowish red (5YR 5/6) redox concentrations; few faint very dark gray (5Y 3/1) redox depletions; weak coarse subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; many very fine and fine roots; few very fine pores; 15 percent rounded cobbles and 15 percent rounded pebbles; neutral (pH 7.2); gradual irregular boundary.

Cg3—44 to 60 inches; yellowish brown (10YR 5/4) very gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; many distinct yellowish red (5YR 5/6) redox concentrations; few faint very dark gray (5Y 3/1) redox depletions; massive; slightly hard, friable, moderately sticky and slightly plastic; common very fine and fine roots; few very fine pores; 10 percent rounded cobbles and 35 percent rounded pebbles; neutral (pH 7.2).

### Range in Characteristics

*Soil temperature:* 36 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 10 to 19 inches

*Seasonal high water table:* At the surface to 12 inches above the surface

*Percent of surface covered by stones:* 0 to 0.1 percent

*A horizon:*

Hue—10YR, 2.5Y, or 5Y

Value—2, 2.5, or 3 dry

Chroma—1 or 2

Clay content—18 to 27 percent

Content of rock fragments—5 to 25 percent (0 to 5 percent cobbles, 5 to 20 percent pebbles)

Reaction—pH 6.1 to 7.3

*Bw horizon:*

Hue—10YR, 2.5Y, or 5Y

Texture—sandy clay loam, loam, or sandy loam

Clay content—18 to 30 percent

Content of rock fragments—10 to 35 percent (0 to 10 percent cobbles, 10 to 25 percent pebbles)

Reaction—pH 6.1 to 7.3

*Cg horizon:*

Hue—10YR, 2.5Y, or 5Y

Value—4 or 5 moist; 5, 6, or 7 dry

Texture—loam, sandy clay loam, or sandy loam

Clay content—18 to 30 percent

Content of rock fragments—0 to 50 percent (0 to 15 percent cobbles, 0 to 35 percent pebbles)

Reaction—pH 5.6 to 7.3

## Franconi Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, ridges, and side slopes of mountains

*Parent material:* Local colluvium or residuum derived from granite

*Slope range:* 4 to 60 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 18 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Fine-loamy, mixed, superactive Ustic Glossocryalfs

### Typical Pedon

Franconi gravelly sandy clay loam, in an area of Franconi, very bouldery-Warwood-Caseypeak, very bouldery, complex, 25 to 60 percent slopes; in a forested area, 2,500 feet south and 1,600 feet east of the northwest corner of sec. 11, T. 4 N., R. 7 W.

Oi—2 inches to 0; forest litter of partially decomposed needles, twigs, and leaves.

E—0 to 5 inches; light brownish gray (10YR 6/2) gravelly sandy clay loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium roots; many very fine and fine pores and few medium pores; 5 percent cobbles and 15 percent pebbles; neutral (pH 6.6); clear smooth boundary.

E/Bt—5 to 11 inches; 70 percent light brownish gray (10YR 6/2) gravelly sandy clay loam, grayish brown (10YR 5/2) moist (E part); 30 percent yellowish brown (10YR 5/4) gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist (Bt part); moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium roots; many very fine and fine pores; few faint clay films bridging sand grains in the Bt part; 20 percent pebbles; moderately acid (pH 6.0); clear smooth boundary.

Bt/E—11 to 19 inches; 85 percent yellowish brown (10YR 5/4) gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist (Bt part); 15 percent light brownish gray (10YR 6/2) gravelly sandy clay loam, grayish brown (10YR 5/2) moist (E part); moderate medium and coarse prismatic

structure parting to moderate fine and medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots and few fine and medium roots; many very fine and few fine pores; many faint clay films on faces of peds and bridging sand grains in the Bt part; 20 percent pebbles; slightly acid (pH 6.2); clear wavy boundary.

Bt1—19 to 28 inches; yellowish brown (10YR 5/4) gravelly clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium and coarse prismatic structure parting to strong fine and medium subangular blocky; hard, firm, moderately sticky and slightly plastic; common very fine roots and few fine and medium roots; many very fine and few fine pores; many faint clay films on faces of peds and bridging sand grains; 5 percent cobbles and 25 percent pebbles; moderately acid (pH 5.8); clear wavy boundary.

Bt2—28 to 34 inches; brown (7.5YR 5/4) gravelly clay loam, dark brown 7.5YR 4/4) moist; weak coarse prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine and few fine pores; common faint clay films on faces of peds and bridging sand grains; 20 percent pebbles; moderately acid (pH 6.0); clear smooth boundary.

Cr—34 to 38 inches; pale brown (10YR 6/3), decomposed granite bedrock (grus) that crushes to very gravelly coarse sand.

R—38 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bt horizon:* 8 to 15 inches

*Depth to Cr horizon:* 20 to 38 inches

*Depth to R layer:* 23 to 40 inches

*Percent of surface covered by boulders:* 1 to 3 percent

*E horizon:*

Hue—10YR or 2.5Y

Value—6 or 7 dry; 4 or 5 moist

Chroma—2 or 3

Texture—coarse sandy loam or sandy clay loam

Clay content—10 to 25 percent

Content of rock fragments—15 to 50 percent (0 to 20 percent cobbles, 15 to 30 percent pebbles)

Reaction—pH 6.1 to 7.3

*E/Bt horizon:*

Hue—10YR or 2.5Y

Value—6 or 7 dry, 5 or 6 moist (E part); 5 or 6 dry, 4 or 5 moist (Bt part)

Chroma—2, 3, or 4  
 Texture—sandy loam or sandy clay loam (E part)  
 Clay content—10 to 25 percent  
 Content of rock fragments—10 to 35 percent (0 to 10 percent cobbles, 10 to 25 percent pebbles)  
 Reaction—pH 5.6 to 6.5

*Bt/E horizon:*

Hue—10YR or 2.5Y  
 Value—5 or 6 dry, 4 or 5 moist (Bt part); 6 or 7 dry, 5 or 6 moist (E part)  
 Chroma—2, 3, or 4  
 Texture—sandy loam or sandy clay loam (E part)  
 Clay content—15 to 30 percent  
 Content of rock fragments—10 to 35 percent (0 to 5 percent cobbles, 10 to 30 percent pebbles)  
 Reaction—pH 5.6 to 6.5

*Bt horizon:*

Hue—7.5YR, 10YR, or 2.5Y  
 Value—5 or 6 dry; 4 or 5 moist  
 Chroma—3 or 4  
 Texture—sandy clay loam or clay loam  
 Clay content—20 to 35 percent  
 Content of rock fragments—10 to 35 percent (0 to 5 percent cobbles, 10 to 25 percent pebbles)  
 Reaction—pH 5.6 to 6.5

**Geohrock Series**

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Stream terraces, alluvial fans, and valley floors

*Parent material:* Gravelly alluvium derived from mixed rock sources

*Slope range:* 1 to 45 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Aridic Haplustalfs

**Typical Pedon**

Geohrock cobbly clay loam, 15 to 35 percent slopes, stony, in rangeland, 850 feet south and 1,350 feet east of the northwest corner of sec. 1, T. 2 N., R. 5 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) cobbly clay loam, dark brown (10YR 3/3) moist; strong fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many

very fine and fine roots; 15 percent rounded cobbles and 15 percent rounded pebbles; neutral (pH 7.2); clear smooth boundary.

Bt—4 to 8 inches; brown (10YR 4/3) gravelly clay loam, dark yellowish brown (10YR 3/4) moist; moderate medium angular blocky structure; hard, firm, moderately sticky and moderately plastic; many very fine and fine roots; many very fine pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds and bridging sand grains; 5 percent rounded cobbles and 20 percent rounded pebbles; few faint lime coatings on undersides of fragments; slightly effervescent; slightly alkaline (pH 7.8); clear wavy boundary.

Btk—8 to 17 inches; brown (10YR 5/3) very gravelly clay loam, brown (10YR 4/3) moist; moderate medium angular blocky structure; hard, firm, moderately sticky and moderately plastic; many very fine and fine roots; many very fine pores; common faint dark grayish brown (10YR 4/2) clay films on faces of peds and bridging sand grains; 10 percent rounded cobbles and 30 percent rounded pebbles; disseminated lime, common distinct lime coatings on fragments; strongly effervescent; moderately alkaline (pH 8.4); gradual smooth boundary.

Bk1—17 to 24 inches; pale brown (10YR 6/3) very gravelly sandy clay loam, brown (10YR 5/3) moist; weak coarse subangular blocky structure; hard, firm, moderately sticky and moderately plastic; common very fine and fine roots; many very fine pores; 15 percent rounded cobbles and 35 percent rounded pebbles; disseminated lime, common distinct lime casts around fragments; violently effervescent; strongly alkaline (pH 8.6); gradual irregular boundary.

Bk2—24 to 60 inches; pale brown (10YR 6/3) very gravelly sandy clay loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; few very fine pores; 10 percent rounded cobbles and 35 percent rounded pebbles; disseminated lime, common distinct lime casts on fragments; strongly effervescent; strongly alkaline (pH 8.6).

**Range in Characteristics**

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bt horizon:* 5 to 9 inches

*Depth to Btk or Bk horizon:* 7 to 12 inches

*Percent of surface covered by stones:* 0 to 0.1 percent

*A horizon:*

Hue—2.5Y, 10YR, or 7.5YR

Value—4, 5, or 6 dry; 3, 4, or 5 moist  
 Chroma—2 or 3  
 Texture—loam or clay loam  
 Clay content—18 to 35 percent  
 Content of rock fragments—15 to 35 percent (0 to 15 percent cobbles, 15 to 20 percent pebbles)  
 Calcium carbonate equivalent—0 to 3 percent  
 Reaction—pH 6.6 to 7.8

*Bt horizon:*

Hue—2.5Y, 10YR, or 7.5YR  
 Value—4, 5, or 6 dry; 3, 4, or 5 moist  
 Chroma—2, 3, or 4  
 Clay content—27 to 35 percent  
 Content of rock fragments—20 to 60 percent (0 to 10 percent cobbles, 20 to 50 percent pebbles)  
 Calcium carbonate equivalent—0 to 5 percent  
 Reaction—pH 7.4 to 8.4

*Btk horizon:*

Hue—2.5Y, 10YR, or 7.5YR  
 Value—5 or 6 dry; 4 or 5 moist  
 Chroma—2 or 3  
 Texture—loam, sandy clay loam, or clay loam  
 Clay content—15 to 35 percent  
 Content of rock fragments—25 to 60 percent (0 to 10 percent cobbles, 25 to 50 percent pebbles)  
 Calcium carbonate equivalent—5 to 15 percent  
 Reaction—pH 7.9 to 8.4

*Bk horizon:*

Hue—2.5Y or 10YR  
 Value—6 or 7 dry; 4 or 5 moist  
 Chroma—2, 3, or 4  
 Texture—sandy clay loam, sandy loam, or loam  
 Clay content—10 to 25 percent  
 Content of rock fragments—35 to 80 percent (0 to 15 percent cobbles, 35 to 75 percent pebbles)  
 Calcium carbonate equivalent—5 to 15 percent  
 Reaction—pH 7.9 to 9.0

## Gnojek Series

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Ridges, escarpments, and side slopes of hills

*Parent material:* Residuum derived from hard, fine grained sandstone or fine grained igneous rock

*Slope range:* 2 to 70 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 38 to 42 degrees F

*Frost-free period:* 80 to 95 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Lithic Argiustolls

### Typical Pedon

Gnojek very cobbly loam, stony, in an area of Gnojek, stony-Wickes, stony-Rock outcrop complex, 35 to 70 percent slopes, in rangeland, 40 feet north and 50 feet west of the southeast corner of sec. 22, T. 3 N., R. 4 W.

A—0 to 3 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; 25 percent angular cobbles and 20 percent angular pebbles; neutral (pH 7.2); clear wavy boundary.

Bt—3 to 7 inches; dark grayish brown (10YR 4/2) very gravelly clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate fine subangular blocky; slightly hard, firm, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; common distinct clay films on faces of peds and bridging sand grains; 15 percent angular cobbles and 35 percent angular pebbles; slightly alkaline (pH 7.4); clear wavy boundary.

Bk—7 to 16 inches; light brownish gray (10YR 6/2) very cobbly loam, brown (10YR 5/3) moist; moderate fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine pores; 25 percent angular cobbles and 30 percent angular pebbles; disseminated lime, common medium masses and threads of lime, common distinct lime coatings on fragments; violently effervescent; moderately alkaline (pH 8.2); gradual wavy boundary.

R—16 inches; hard, brown (10YR 5/3), fine grained sandstone.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the lithic contact (if it occurs at a depth of less than 12 inches)

*Thickness of the mollic epipedon:* 7 to 10 inches

*Depth to argillic horizon:* 3 to 7 inches

*Depth to Bk horizon:* 7 to 16 inches

*Depth to bedrock:* 10 to 20 inches

*Percent of surface covered by stones or boulders:* 0.01 to 0.1 percent

*A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 3 or 4 moist

Chroma—2 or 3

Clay content—15 to 27 percent

Content of rock fragments—35 to 50 percent (15 to 25 percent cobbles, 20 to 25 percent pebbles)

Reaction—pH 6.6 to 7.3

*Bt horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2, 3, or 4

Texture—loam or clay loam

Clay content—23 to 35 percent

Content of rock fragments—35 to 80 percent (0 to 15 percent stones, 15 to 35 percent cobbles, 20 to 40 percent pebbles)

Reaction—pH 6.6 to 7.8

*Bk horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Clay content—18 to 27 percent

Content of rock fragments—35 to 80 percent (0 to 15 percent stones, 15 to 35 percent cobbles, 20 to 40 percent pebbles)

Calcium carbonate equivalent—10 to 25 percent

Reaction—pH 7.4 to 8.4

## Handke Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Somewhat poorly drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Flood plains, flood-plain steps, and drainageways

*Parent material:* Recent alluvium

*Slope range:* 0 to 2 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Sandy, mixed, frigid  
Oxyaquic Ustifluvents

### Typical Pedon

Handke fine sandy loam, in an area of Havre-Ryell-

Handke complex, 0 to 2 percent slopes, in rangeland, 1,900 feet south and 700 feet west of the northeast corner of sec. 1, T. 9 N., R. 3 W.

A—0 to 4 inches; grayish brown (2.5Y 5/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; 10 percent rounded pebbles; slightly alkaline (pH 7.6); clear smooth boundary.

C1—4 to 9 inches; light brownish gray (2.5Y 6/2) loamy sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose, nonsticky and nonplastic; many very fine and few fine roots; 10 percent rounded pebbles; slightly alkaline (pH 7.8); clear smooth boundary.

C2—9 to 38 inches; light brownish gray (2.5Y 6/2) loamy sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; 5 percent rounded pebbles; common faint lime coatings on undersides of fragments; slightly effervescent; slightly alkaline (pH 7.6); clear smooth boundary.

2C3—38 to 60 inches; light yellowish brown (2.5Y 6/4) very fine sandy loam, olive brown (2.5Y 4/4) moist; common fine distinct brownish yellow (10YR 6/6) redox concentrations; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; 5 percent rounded pebbles; slightly alkaline (pH 7.4).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 12 and 36 inches

*Depth to seasonal high water table:* 24 to 42 inches for periods ranging from 1 week to several weeks during spring runoff

*Depth to 2C horizon:* 20 to 40 inches

*A horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2 or 3

Texture—sandy loam or fine sandy loam

Clay content—5 to 20 percent

Content of rock fragments—0 to 15 percent pebbles

Reaction—pH 6.6 to 7.8

*C horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—2 or 3

Texture—primarily sand and loamy sand; thin strata of fine sandy loam, sandy loam, and

loam and some evidence of a buried surface layer

Clay content—2 to 10 percent

Content of rock fragments—0 to 15 percent pebbles

Calcium carbonate equivalent—0 to 10 percent

Reaction—pH 6.6 to 8.4

*2C horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—3 or 4

Texture—very fine sandy loam, fine sandy loam, sandy loam, or loam

Clay content—5 to 18 percent

Content of rock fragments—0 to 5 percent pebbles

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 6.6 to 8.4

## Hanson Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, ridges, and side slopes of mountains

*Parent material:* Colluvium and slope alluvium derived from limestone

*Slope range:* 8 to 70 percent

*Elevation range:* 5,500 to 7,500 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 38 to 42 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, carbonatic Calcic Haplocryolls

### Typical Pedon

Hanson gravelly loam, stony, in an area of Tropol, bouldery-Hanson, stony-Rock outcrop complex, 8 to 25 percent slopes, in rangeland, 2,050 feet west and 1,150 feet north of the southeast corner of sec. 3, T. 5 N., R. 2 W.

A—0 to 6 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; 5 percent angular cobbles and 20 percent angular pebbles; few faint lime coatings on undersides of fragments; slightly effervescent; slightly alkaline (pH 7.4); clear wavy boundary.

Bw—6 to 13 inches; grayish brown (10YR 5/2) very

gravelly loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine and fine pores; 10 percent angular cobbles and 30 percent angular pebbles; disseminated lime, few distinct lime coatings on fragments; violently effervescent; moderately alkaline (pH 8.4); gradual wavy boundary.

Bk1—13 to 27 inches; white (10YR 8/2) very gravelly loam, light gray (10YR 7/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; 10 percent angular cobbles and 40 percent angular pebbles; disseminated lime, common fine threads and masses of lime, common distinct lime casts around fragments; violently effervescent; moderately alkaline (pH 8.4); gradual irregular boundary.

Bk2—27 to 60 inches; light gray (10YR 7/2) very gravelly loam, pale brown (10YR 6/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; few very fine pores; 15 percent angular cobbles and 40 percent angular pebbles; disseminated lime, few fine masses and threads of lime, common distinct lime casts around fragments; violently effervescent; moderately alkaline (pH 8.4).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 12 inches

*Depth to Bk horizon:* 8 to 16 inches

*Percent of surface covered by stones and boulders:* 0.1 to 3.0 percent

*A horizon:*

Value—3, 4, or 5 dry; 2 or 3 moist

Chroma—1 or 2

Clay content—15 to 27 percent

Content of rock fragments—15 to 50 percent (0 to 25 percent stones and cobbles, 15 to 45 percent pebbles)

Calcium carbonate equivalent—0 to 10 percent

Reaction—pH 6.6 to 7.8

*Bw horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—loam or clay loam

Clay content—15 to 32 percent

Content of rock fragments—35 to 80 percent (10 to 55 percent stones and cobbles, 10 to 30 percent pebbles or channers)

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 6.6 to 8.4

*Bk horizon:*

Hue—10YR or 2.5Y

Value—7 or 8 dry; 5, 6, or 7 moist

Chroma—2, 3, or 4

Texture—loam or clay loam

Clay content—15 to 32 percent

Content of rock fragments—35 to 80 percent (10 to 35 percent stones and cobbles, 25 to 45 percent pebbles)

Calcium carbonate equivalent—40 to 60 percent

Reaction—pH 7.4 to 8.4

## Hapgood Family

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, escarpments, and side slopes of mountains

*Parent material:* Colluvium and slope alluvium derived from igneous and metamorphic rock

*Slope range:* 8 to 60 percent

*Elevation range:* 5,000 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Pachic Haplocryolls

### Typical Pedon

Hapgood gravelly loam, in rangeland, 2,500 feet west and 200 feet north of the southeast corner of sec. 20, T. 6 S., R. 2 W., Madison County, Montana:

A—0 to 18 inches; very dark grayish brown (10YR 3/2) gravelly loam, black (10YR 2/1) moist; moderate fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; 15 percent angular pebbles; slightly acid (pH 6.4); gradual smooth boundary.

C—18 to 60 inches; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak coarse angular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; 10

percent angular cobbles and 35 percent angular pebbles; neutral (pH 7.0).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 16 to 60 inches

*A horizon:*

Value—2, 3, 4, or 5 dry; 2 or 3 moist

Chroma—1, 2, or 3

Clay content—18 to 27 percent

Content of rock fragments—15 to 60 percent (0 to 10 percent stones, 0 to 25 percent angular cobbles, 15 to 35 percent angular pebbles)

Reaction—pH 6.1 to 6.5

*C horizon:*

Value—4, 5, 6, or 7 dry; 3, 4, or 5 moist

Chroma—2, 3, 4, or 5

Texture—loam or clay loam

Clay content—18 to 32 percent

Content of rock fragments—35 to 60 percent (0 to 5 percent stones, 10 to 20 percent angular cobbles, 25 to 45 percent angular pebbles)

Reaction—pH 6.6 to 7.3

## Havre Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Flood plains, flood-plain steps, and drainageways

*Parent material:* Stratified, calcareous loamy alluvium

*Slope range:* 0 to 2 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, calcareous, frigid Aridic Ustifluvents

### Typical Pedon

Havre loam, in an area of Havre-Ryell-Handke complex, 0 to 2 percent slopes, in rangeland, 2,690 feet south and 2,160 feet west of the northeast corner of sec. 4, T. 1 N., R. 3 W.

A1—0 to 4 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; strong medium granular structure; slightly hard,

friable, slightly sticky and slightly plastic; many very fine and fine roots; disseminated lime; slightly effervescent; moderately alkaline (pH 8.4); clear smooth boundary.

- A2—4 to 9 inches; light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 5/2) moist; moderate coarse prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine pores; disseminated lime; strongly effervescent; moderately alkaline (pH 8.4); clear smooth boundary.
- C1—9 to 31 inches; grayish brown (2.5Y 5/2) loam, dark grayish brown (10YR 4/2) moist; weak coarse prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine pores; 5 percent rounded pebbles; disseminated lime, few faint lime coatings on undersides of fragments; strongly effervescent; moderately alkaline (pH 8.4); clear smooth boundary.
- C2—31 to 60 inches; light brownish gray (10YR 6/2) loam composed of stratified loam, silt loam, and fine sandy loam; thin strata of gravelly loamy fine sand; grayish brown (10YR 5/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; few very fine pores; 10 percent rounded pebbles; disseminated lime, common faint lime coatings on fragments; strongly effervescent; slightly alkaline (pH 7.6).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Note:* Colors in the surface horizon do not meet the requirements for a mollic epipedon after mixing to a depth of 7 inches.

#### *A horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2 or 3

Clay content—15 to 27 percent

Calcium carbonate equivalent—1 to 5 percent

Content of rock fragments—0 to 15 percent pebbles

Reaction—pH 6.6 to 8.4

#### *C horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2 or 3

Texture—loam consisting of strata of loam, silt loam, or fine sandy loam

Clay content—18 to 27 percent

Calcium carbonate equivalent—5 to 10 percent

Content of rock fragments—0 to 15 percent pebbles

Reaction—pH 7.4 to 8.4

## Haxby Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Ridges, side slopes of hills, and strath terraces

*Parent material:* Local colluvium, slope alluvium, and residuum derived from hard, fine grained sandstone or igneous rock

*Slope range:* 4 to 45 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Coarse-loamy, mixed, superactive, frigid Haplocalcidic Haplustepts

### Typical Pedon

Haxby loam, in an area of Haxby-Amesha-Rencot complex, 4 to 15 percent slopes, in rangeland, 1,750 feet north and 1,900 feet west of the southeast corner of sec. 12, T. 2 N., R. 2 W.

A1—0 to 3 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; neutral (pH 7.2); clear wavy boundary.

A2—3 to 5 inches; yellowish brown (10YR 5/4) loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; common fine and very fine pores; slightly alkaline (pH 7.4); clear smooth boundary.

Bk1—5 to 14 inches; light gray (10YR 7/2) loam, pale brown (10YR 6/3) moist; moderate medium prismatic structure parting to weak medium subangular blocky; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine pores; 5 percent pebbles; disseminated lime, common fine masses and threads of lime, common faint lime coatings

on fragments; violently effervescent; moderately alkaline (pH 8.3); gradual wavy boundary.

Bk2—14 to 21 inches; pale yellow (2.5Y 7/4) sandy loam, light yellowish brown (2.5Y 6/4) moist; weak coarse prismatic structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; few or common very fine pores; 5 percent pebbles; disseminated lime, common fine masses and threads of lime, common faint lime coatings on fragments; violently effervescent; moderately alkaline (pH 8.4); gradual wavy boundary.

Bk3—21 to 32 inches; light yellowish brown (10YR 6/4) gravelly sandy loam, yellowish brown (10YR 5/4) moist; weak coarse prismatic structure; slightly hard, friable, nonsticky and nonplastic; few very fine roots; few or common very fine and fine pores; 20 percent pebbles; disseminated lime, common masses and threads of lime, common distinct lime coatings on fragments; strongly effervescent; moderately alkaline (pH 8.4); clear smooth boundary.

R—32 inches; hard, fine grained igneous bedrock.

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches

*Depth to Bk horizon:* 4 to 8 inches

*Depth to bedrock:* 20 to 40 inches

*A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 3 or 4 moist

Chroma—2, 3, or 4

Clay content—15 to 25 percent

Content of rock fragments—0 to 15 percent pebbles

Reaction—pH 6.6 to 7.8

*Bk1 and Bk2 horizons:*

Hue—10YR or 2.5Y

Value—6, 7, or 8 dry; 5, 6, or 7 moist

Chroma—2, 3, or 4

Texture—loam or sandy loam

Clay content—10 to 18

Content of rock fragments—0 to 15 percent pebbles

Calcium carbonate equivalent—15 to 25 percent

Reaction—pH 7.9 to 8.4

*Bk3 horizon:*

Hue—10YR or 2.5Y

Value—6 or 7 dry; 5 or 6 moist

Chroma—2, 3, or 4

Texture—sandy loam or loam

Clay content—10 to 18 percent

Content of rock fragments—5 to 30 percent pebbles

Calcium carbonate equivalent—5 to 12 percent

Reaction—pH 7.9 to 8.4

### Helmville Family

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderately slow (0.2 to 0.6 inch per hour)

*Landform:* Mountain side slopes and valleys

*Parent material:* Colluvium and slope alluvium derived mainly from limestone, sandstone, and igneous rocks

*Slope range:* 15 to 70 percent

*Elevation range:* 5,500 to 7,500 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Eutric Haplocryalfs

### Typical Pedon

Helmville gravelly loam, in an area of Whitore, stony-Helmville, bouldery-Firada, very stony, complex, 15 to 45 percent slopes; in a forested area, 1,175 feet north and 100 feet west of the southeast corner of sec. 2, T. 5 N., R. 2 W.

Oi—1 inch to 0; partially decomposed forest litter.

E—0 to 1 inch; dark grayish brown (10YR 4/2) gravelly loam, brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common very fine roots; 15 percent pebbles; neutral (pH 7.2); abrupt smooth boundary.

Bt1—1 to 6 inches; brown (10YR 5/3) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine pores; common faint discontinuous clay films on faces of peds; 35 percent pebbles; slightly alkaline (pH 7.4); gradual wavy boundary.

Bt2—6 to 13 inches; brown (10YR 5/3) very gravelly clay loam, brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots and common medium roots; many very fine pores; common faint continuous clay films on faces of peds and bridging sand grains; 20 percent cobbles and 40

percent pebbles; slightly alkaline (pH 7.6); gradual wavy boundary.

- Bt3—13 to 17 inches; brown (10YR 5/3) very cobbly clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots and common medium roots; many very fine and fine pores; common faint continuous clay films on faces of peds and bridging sand grains; 30 percent cobbles and 30 percent pebbles; disseminated lime in the lower part; slightly effervescent; slightly alkaline (pH 7.8); gradual irregular boundary.
- Bk1—17 to 24 inches; brown (10YR 5/3) very cobbly clay loam, brown (10YR 4/3) moist; strong fine subangular blocky structure; hard, firm, moderately sticky and moderately plastic; many very fine and fine roots and common medium roots; many very fine and fine pores; 25 percent cobbles and 30 percent pebbles; disseminated lime, common threads and masses of lime, many distinct lime coatings on fragments; strongly effervescent; slightly alkaline (pH 7.8); gradual wavy boundary.
- Bk2—24 to 60 inches; very pale brown (10YR 7/3) very gravelly loam, brown (10YR 5/3) moist; massive; slightly hard, firm, slightly sticky and slightly plastic; common very fine roots and few fine and medium roots; common fine and very fine pores; 10 percent cobbles and 25 percent pebbles; disseminated lime, many fine threads and masses of lime, many distinct lime casts on fragments; violently effervescent; moderately alkaline (pH 8.4).

### Range in Characteristics

*Soil temperature:* 36 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bt horizon:* 1 to 9 inches

*Depth to Bk horizon:* 14 to 28 inches

*Percent of surface covered by stones or boulders:* 0.01 to 20 percent

*E horizon:*

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2, 3, or 4

Clay content—15 to 27 percent

Content of rock fragments—15 to 35 percent (0 to 20 percent stones, flagstones, and cobbles; 15 to 30 percent pebbles)

Reaction—pH 6.1 to 7.3

*Bt horizon:*

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2, 3, 4, or 5

Clay content—20 to 35 percent

Texture—loam or clay loam

Content of rock fragments—35 to 70 percent (10 to 35 percent stones and cobbles, 25 to 50 percent pebbles)

Calcium carbonate equivalent—3 to 15 percent

Reaction—pH 6.6 to 7.8

*Bk horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—3, 4, or 5

Texture—loam, sandy loam, or clay loam

Clay content—18 to 35 percent

Content of rock fragments—40 to 90 percent (10 to 45 percent stones and cobbles, 25 to 45 percent pebbles)

Calcium carbonate equivalent—15 to 40 percent

Reaction—pH 7.4 to 8.4

### Hilger Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, escarpments, and side slopes of hills

*Parent material:* Slope alluvium or colluvium derived mainly from fine grained igneous rock and hard sandstone

*Slope range:* 2 to 35 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 95 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Argiustolls

### Typical Pedon

Hilger very cobbly loam, very stony, in an area of Hilger, very stony-Hilger, rubbly-Rock outcrop complex, 8 to 35 percent slopes, in rangeland, 1,800 feet south and 1,300 feet west of the northeast corner of sec. 16, T. 4 N., R. 4 W.

A—0 to 8 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; 30 percent cobbles and 25 percent pebbles; slightly alkaline (pH 7.6); clear smooth boundary.

Bt—8 to 14 inches; brown (10YR 5/3) very cobbly clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine pores; continuous faint clay films on faces of peds and on surface of coarse fragments; 35 percent cobbles and 25 percent pebbles; slightly alkaline (pH 7.6); clear smooth boundary.

Bk1—14 to 24 inches; pale brown (10YR 6/3) very cobbly loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine pores; 35 percent cobbles and 25 percent pebbles; disseminated lime, many fine threads and masses of lime, continuous distinct lime coatings on fragments; violently effervescent; strongly alkaline (pH 8.6); gradual wavy boundary.

Bk2—24 to 60 inches; light yellowish brown (10YR 6/4) extremely cobbly loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, slightly sticky and nonplastic; common very fine roots; few very fine pores; 40 percent cobbles and 35 percent pebbles; disseminated lime, common fine threads and masses of lime, continuous faint lime coatings on fragments; strongly effervescent; moderately alkaline (pH 8.2).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 14 inches

*Depth to Bt horizon:* 6 to 12 inches

*Depth to Bk horizon:* 13 to 18 inches

*Percent of surface covered by stones or boulders:* 0 to 20 percent

#### *A horizon:*

Value—3 or 4 dry; 2 or 3 moist

Clay content—15 to 27 percent

Content of rock fragments—15 to 60 percent (10 to 35 percent cobbles and stones, 5 to 25 percent pebbles)

Reaction—pH 6.6 to 7.8

#### *Bt horizon:*

Value—4 or 5 dry; 3 or 4 moist

Chroma—2, 3, or 4

Texture—loam, clay loam, or sandy clay loam

Clay content—25 to 35 percent

Content of rock fragments—35 to 80 percent (35 to 60 percent cobbles and stones, 10 to 30 percent pebbles)

Reaction—pH 7.4 to 8.4

#### *Bk horizon:*

Hue—2.5Y or 10YR

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—loam or sandy loam

Clay content—15 to 27 percent

Content of rock fragments—35 to 85 percent (25 to 70 percent cobbles and stones, 15 to 35 percent pebbles)

Calcium carbonate equivalent—15 to 30 percent

Reaction—pH 7.9 to 9.0

### Hiore Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Somewhat excessively drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Side slopes of mountains and valleys

*Parent material:* Slope alluvium and residuum derived from granite

*Slope range:* 15 to 70 percent

*Elevation range:* 5,600 to 7,500 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Ustic Eutrocrypts

### Typical Pedon

Hiore coarse sandy loam, stony, in an area of Hiore, stony-Kurrie, stony-Caseypeak, very stony, complex, 35 to 60 percent slopes; in a forested area, 300 feet west and 2,600 feet north of the southeast corner of sec. 7, T. 6 N., R. 4 W.

Oi—1 inch to 0; forest litter of partially decomposed needles and twigs.

A1—0 to 2 inches; dark grayish brown (10YR 4/2) coarse sandy loam, very dark brown (10YR 2/2) moist; moderate very fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; 5 percent granite pebbles; neutral (pH 7.0); abrupt smooth boundary.

A2—2 to 7 inches; grayish brown (10YR 5/2) gravelly coarse sandy loam, dark grayish brown (10YR 4/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots and few medium and coarse roots; 15 percent granite pebbles; neutral (pH 7.0); gradual smooth boundary.

Bw1—7 to 22 inches; light brownish gray (10YR 6/2) gravelly coarse sandy loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and few medium roots; common fine pores; 30 percent granite pebbles; neutral (pH 7.2); gradual smooth boundary.

Bw2—22 to 35 inches; light gray (10YR 7/2) very gravelly loamy coarse sand, brown (10YR 5/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few fine and medium roots; 40 percent granite pebbles; neutral (pH 7.2); gradual smooth boundary.

BC—35 to 60 inches; light yellowish brown (10YR 6/4) very gravelly loamy coarse sand, yellowish brown (10YR 5/6) moist; single grain; loose, nonsticky and nonplastic; few medium roots; 60 percent granite pebbles; neutral (pH 7.2).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches

*Percent of surface covered by stones or boulders:* 0 to 0.1 percent

#### *A horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 2, 3, or 4 moist

Chroma—2 or 3

Texture—sandy loam or coarse sandy loam

Clay content—8 to 20 percent

Content of rock fragments—5 to 35 percent (0 to 10 percent cobbles or stones, 5 to 25 percent pebbles)

Reaction—pH 5.6 to 7.3

#### *Bw horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—2, 3, 4, or 6

Texture—coarse sandy loam or loamy coarse sand

Clay content—8 to 18 percent

Content of rock fragments—25 to 60 percent (0 to 10 percent cobbles, stones, or boulders; 25 to 50 percent pebbles)

Reaction—pH 5.6 to 7.3

#### *BC horizon:*

Value—6 or 7 dry; 5 or 6 moist

Chroma—3, 4, 6, or 8

Texture—loamy coarse sand or coarse sandy loam

Clay content—2 to 12 percent

Content of rock fragments—35 to 70 percent (0 to 10 percent cobbles and stones, 35 to 60 percent pebbles)

Reaction—pH 5.6 to 7.3

### Holter Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans and side slopes of hills

*Parent material:* Colluvium derived from igneous and argillite bedrock

*Slope range:* 8 to 45 percent

*Elevation range:* 4,400 to 6,200 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Argiustolls

### Typical Pedon

Holter channery loam, in an area of Holter-Castner channery loams, 8 to 45 percent slopes, in rangeland, 700 feet west and 600 feet south of the northeast corner of sec. 2, T. 13 N., R. 5 W., Lewis and Clark County, Montana:

A1—0 to 8 inches; dark grayish brown (10YR 4/2) channery loam, very dark grayish brown (10YR 3/2) moist; moderate very thin platy structure parting to moderate very fine granular; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and few fine roots; many very fine tubular and interstitial pores; 20 percent channers; moderately acid; gradual smooth boundary.

A2—8 to 12 inches; brown (10YR 5/3) very channery loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, sticky and slightly plastic; many very fine and few fine roots; many very fine tubular and interstitial pores; 55 percent channers; moderately acid; gradual smooth boundary.

Bt1—12 to 28 inches; yellowish brown (10YR 5/4) extremely channery clay loam, dark brown (10YR 4/3) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, sticky and slightly plastic; common very fine and few fine roots; many very fine tubular and interstitial pores; common distinct clay films on faces of peds; 65 percent channers; slightly acid; gradual smooth boundary.

Bt2—28 to 42 inches; brown (10YR 5/3) extremely

channery clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, sticky and slightly plastic; common very fine tubular and interstitial pores; common distinct clay films on faces of peds and clay bridges between sand grains; 65 percent channers; slightly acid; clear smooth boundary.

Bk—42 to 60 inches; brown (10YR 5/3) extremely channery loam, dark yellowish brown (10YR 4/4) moist; weak medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots to a depth of 50 inches and few very fine roots below that depth; many very fine tubular and interstitial pores; 60 percent channers; continuous faint lime casts on undersides of fragments; strongly effervescent; slightly alkaline.

### Range in Characteristics

*Soil temperature:* 42 to 47 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 15 inches

*Depth to Bk horizon:* 25 to 50 inches

#### A1 horizon:

Hue—7.5YR or 10YR

Value—4 or 5 dry; 2 or 3 moist

Chroma—2 or 3

Clay content—15 to 25 percent

Content of rock fragments—15 to 35 percent (0 to 5 percent flagstones, 15 to 30 percent channers)

Reaction—pH 5.6 to 7.3

#### A2 horizon:

Hue—5YR, 7.5YR, or 10YR

Value—4 or 5 dry; 3 moist

Chroma—2 or 3

Clay content—18 to 27 percent

Content of rock fragments—40 to 65 percent (0 to 5 percent flagstones, 40 to 60 percent channers)

Reaction—pH 5.6 to 7.3

#### Bt horizon:

Hue—5YR, 7.5YR, or 10YR

Value—5 or 6 dry; 4 or 5 moist

Chroma—3 or 4

Texture—loam or clay loam

Clay content—25 to 35 percent

Content of rock fragments—60 to 80 percent (5 to 10 percent flagstones, 55 to 75 percent channers)

Reaction—pH 6.1 to 7.3

#### Bk horizon:

Hue—5YR, 7.5YR, or 10YR

Value—6 or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, 4, or 6

Texture—loam or sandy clay loam

Clay content—10 to 25 percent

Content of rock fragments—60 to 80 percent (5 to 10 percent flagstones, 55 to 75 percent channers)

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.4 to 8.4

## Hoyt Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans and side slopes of hills

*Parent material:* Colluvium and slope alluvium derived from fine grained igneous bedrock and till

*Slope range:* 4 to 60 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 90 to 105 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Typic Haplustalfs

### Typical Pedon

Hoyt loam, in an area of Lumpgulch, bouldery-Hoyt-Shaboom, very bouldery, complex, 4 to 15 percent slopes; in a forested area, 2,600 feet north and 2,500 feet east of the southwest corner of sec. 33, T. 9 N., R. 2 W.

Oi—2 inches to 0; partially decomposed twigs and needles.

A—0 to 8 inches; brown (10YR 4/3) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium and coarse roots; 10 percent granite pebbles; moderately acid (pH 5.7); clear smooth boundary.

Bt1—8 to 21 inches; brown (10YR 5/3) clay loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to weak fine subangular blocky; many very fine and fine roots and few medium and coarse roots; many very fine pores; common discontinuous faint clay films on faces of peds and bridging sand grains; 10 percent granite pebbles; slightly acid (pH 6.4); clear wavy boundary.

Bt2—21 to 42 inches; light olive brown (2.5Y 5/4) gravelly sandy clay loam, olive brown (2.5Y 4/4) moist; moderate medium prismatic structure parting to moderate fine subangular blocky; many very fine and fine roots and few medium and coarse roots; many very fine pores; common discontinuous distinct clay films on faces of peds and bridging sand grains; 15 percent granite pebbles; slightly acid (pH 6.5); clear wavy boundary.

Bt3—42 to 60 inches; brown (10YR 5/3) gravelly sandy clay loam, brown (10YR 4/3) moist; weak coarse prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots and few medium and coarse roots; common very fine pores; few discontinuous faint clay films on faces of peds and bridging sand grains; 20 percent granite pebbles; neutral (pH 6.6).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bt horizon:* 6 to 13 inches

*Percent of surface covered by stones or boulders:* 0 to 3 percent

#### A horizon:

Value—4 or 5 dry; 2 or 3 moist

Chroma—2 or 3

Texture—loam or sandy clay loam

Clay content—18 to 27 percent

Content of rock fragments—0 to 15 percent (0 to 5 percent cobbles, 0 to 10 percent pebbles)

Reaction—pH 5.6 to 7.3

#### Bt horizon:

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 3 or 4 moist

Chroma—3 or 4

Texture—clay loam, sandy clay loam, or loam

Clay content—18 to 35 percent

Content of rock fragments—10 to 35 percent (0 to 5 percent cobbles, 10 to 30 percent pebbles)

Reaction—pH 6.1 to 7.3

### Jeffcity Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Ridges and side slopes of hills

*Parent material:* Slope alluvium and residuum derived from granite

*Slope range:* 2 to 45 percent

*Elevation range:* 5,000 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Typic Argiustolls

### Typical Pedon

Jeffcity loam, in an area of Placerton-Connieo-Jeffcity complex, 4 to 15 percent slopes, in rangeland, 950 feet south and 200 feet east of the northwest corner of sec. 11, T. 5 N., R. 5 W.

A—0 to 7 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and few fine roots; many very fine and fine and few medium pores; 5 percent granite pebbles; neutral (pH 7.2); clear smooth boundary.

Bt—7 to 14 inches; yellowish brown (10YR 5/4) gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; weak medium prismatic structure parting to moderate medium and fine subangular blocky; slightly hard, friable, moderately sticky and slightly plastic; many very fine and few fine roots; many very fine and few fine pores; common faint clay films on faces of peds and bridging sand grains; 30 percent granite pebbles; neutral (pH 7.3); gradual wavy boundary.

Bk—14 to 33 inches; light olive brown (2.5Y 5/4) gravelly coarse sandy loam, olive brown (2.5Y 4/4) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; few very fine roots; common very fine pores; 30 percent granite pebbles; disseminated lime, many medium and large seams and masses of lime; strongly effervescent; moderately alkaline (pH 8.0); gradual irregular boundary.

Cr—33 to 38 inches; light olive brown (2.5Y 5/4), decomposed granite bedrock (grus) that crushes to very gravelly loamy coarse sand or loamy coarse sand.

R—38 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 15 inches

*Depth to Bt horizon:* 4 to 8 inches

*Depth to Bk horizon:* 13 to 20 inches

*Depth to Cr horizon:* 20 to 38 inches

*Depth to R layer:* 23 to 40 inches

*Percent of surface covered by stones or boulders:* 0 to 0.1 percent

*A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 2 or 3 moist

Chroma—2 or 3

Texture—coarse sandy loam or loam

Clay content—10 to 25 percent

Content of rock fragments—0 to 15 percent pebbles

Reaction—pH 6.1 to 7.3

*Bt horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—3 or 4

Texture—sandy clay loam or clay loam

Clay content—20 to 30 percent

Content of rock fragments—5 to 35 percent pebbles

Reaction—pH 6.6 to 7.8

*Bk horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—coarse sandy loam or sandy loam

Clay content—10 to 18 percent

Content of rock fragments—15 to 45 percent pebbles

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.9 to 8.4

## Judco Series

*Depth class:* Deep (40 to 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Divides and side slopes of mountains

*Parent material:* Colluvium, slope alluvium, and residuum derived from welded tuff bedrock

*Slope range:* 15 to 60 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Vitrandic Eutrocryepts

## Typical Pedon

Judco very gravelly sandy loam, in a forested area, 400 feet east and 2,100 feet south of the northwest corner of sec. 14, T. 3 N., R. 11 W., Deer Lodge County, Montana:

Oe—2 inches to 0; well decomposed needles, twigs, and leaves.

A1—0 to 2 inches; dark gray (10YR 4/1) very gravelly sandy loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium roots; 10 percent cobbles and 30 percent pebbles; strongly acid (pH 5.4); clear wavy boundary.

A2—2 to 4 inches; gray (10YR 5/1) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots and few medium and coarse roots; many very fine pores; 10 percent cobbles and 30 percent pebbles; moderately acid (pH 5.6); clear wavy boundary.

Bw—4 to 10 inches; yellowish brown (10YR 5/4) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots and few medium and coarse roots; many very fine pores; 10 percent cobbles and 30 percent pebbles; moderately acid (pH 6.0); clear wavy boundary.

BC1—10 to 21 inches; light gray (2.5Y 7/2) very gravelly sandy loam, dark grayish brown (2.5Y 4/2) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; common fine pores; 10 percent cobbles and 45 percent pebbles; slightly acid (pH 6.4); gradual wavy boundary.

BC2—21 to 38 inches; light gray (2.5Y 7/2) very gravelly sandy clay loam, grayish brown (2.5Y 5/2) moist; weak coarse subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; common very fine and fine roots and few medium roots; common fine pores; 5 percent cobbles and 45 percent pebbles; neutral (pH 6.6); gradual wavy boundary.

C—38 to 58 inches; light gray (10YR 7/2) very gravelly sandy clay loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; few very fine, fine, and medium roots; 5 percent cobbles and 45 percent pebbles; neutral (pH 6.6); clear wavy boundary.

Cr—58 to 60 inches; light gray (10YR 7/2), decomposing welded tuff bedrock that crushes to very gravelly sandy loam.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Content of volcanic glass:* More than 30 percent in the coarse silt and sand fraction of one or more horizons

*Depth to Cr horizon:* 50 to 60 inches

*Percent of surface covered by stones or boulders:* 0.01 to 0.1 percent

#### A1 horizon:

Hue—10YR or 2.5Y

Value—3 or 4 dry; 2 or 3 moist

Chroma—1 or 2

Clay content—18 to 27 percent

Content of rock fragments—15 to 60 percent (0 to 30 percent cobbles and stones, 15 to 30 percent pebbles)

Reaction—pH 5.1 to 6.5

#### A2 horizon:

Hue—10YR or 2.5Y

Value—5 or 6 dry; 3, 4, or 5 moist

Chroma—1 or 2

Texture—loam, sandy loam, or sandy clay loam

Clay content—18 to 27 percent

Content of rock fragments—35 to 60 percent (5 to 15 percent cobbles and stones, 30 to 45 percent pebbles)

Reaction—pH 5.1 to 6.5

#### Bw horizon:

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—loam, sandy loam, or sandy clay loam

Clay content—18 to 27 percent

Content of rock fragments—35 to 55 percent (5 to 15 percent cobbles and stones, 30 to 40 percent pebbles)

Reaction—pH 5.6 to 7.3

#### BC and C horizons:

Hue—10YR, 2.5Y, or 5Y

Value—6 or 7 dry; 4, 5, or 6 moist

Chroma—1 or 2

Texture—loam, sandy loam, or sandy clay loam

Clay content—15 to 27 percent

Content of rock fragments—35 to 60 percent (5 to 15 percent cobbles and stones, 30 to 45 percent pebbles)

Reaction—pH 5.6 to 7.3

## Judell Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Stream terraces, alluvial fans, and side slopes of hills

*Parent material:* Slope alluvium and colluvium derived from limestone

*Slope range:* 1 to 35 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Fine-loamy, carbonatic, frigid Typic Calcicustolls

### Typical Pedon

Judell loam, 2 to 8 percent slopes, in rangeland, 1,675 feet north and 1,825 feet west of the southeast corner of sec. 35, T. 4 N., R. 2 W.

A—0 to 5 inches; grayish brown (2.5Y 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; 5 percent pebbles; disseminated lime; slightly effervescent; slightly alkaline (pH 7.5); clear wavy boundary.

Bk1—5 to 12 inches; light brownish gray (2.5Y 6/2) gravelly loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine pores; 20 percent pebbles; disseminated lime, common fine masses of lime, common faint lime coatings on undersides of fragments; violently effervescent; moderately alkaline (pH 8.4); gradual wavy boundary.

Bk2—12 to 26 inches; light gray (2.5Y 7/2) gravelly loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; common fine pores; 25 percent pebbles; disseminated lime, many fine and medium masses of lime, common distinct lime casts on fragments; violently effervescent; moderately alkaline (pH 8.4); gradual wavy boundary.

Bk3—26 to 60 inches; light gray (2.5Y 7/2) gravelly loam, brown (10YR 5/3) moist; massive; slightly

hard, friable, nonsticky and nonplastic; common very fine roots; 30 percent pebbles; disseminated lime, many fine and medium masses of lime, common distinct lime casts on fragments; violently effervescent; moderately alkaline (pH 8.4).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 9 inches

*Depth to Bk horizon:* 5 to 10 inches

*Percent of surface covered by stones or boulders:* 0 to 3 percent

#### *A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 2 or 3 moist

Chroma—1 or 2

Clay content—18 to 27 percent

Content of rock fragments—5 to 45 percent (0 to 20 percent cobbles and stones, 5 to 25 percent pebbles)

Calcium carbonate equivalent—3 to 10 percent

Reaction—pH 7.4 to 8.4

#### *Bk horizon:*

Hue—10YR or 2.5Y

Value—6, 7, or 8 dry; 4, 5, or 6 moist

Chroma—2 or 3

Clay content—18 to 27 percent

Content of rock fragments—15 to 35 percent (0 to 5 percent cobbles and stones, 5 to 30 percent pebbles)

Calcium carbonate equivalent—15 to 60 percent (one or more horizons averaging 40 to 60 percent)

Reaction—pH 7.9 to 9.0

## Kadygulch Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, escarpments, and side slopes of hills

*Parent material:* Colluvium and slope alluvium derived from fine grained and coarse grained igneous rocks

*Slope range:* 35 to 60 percent

*Elevation range:* 4,400 to 5,800 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Haplustepts

### Typical Pedon

Kadygulch gravelly loam, in an area of Kadygulch-Roegulch, stony, complex, 35 to 60 percent slopes; in a forested area, 1,900 feet north and 1,200 feet west of the southeast corner of sec. 14, T. 7 N., R. 4 W.

Oi—2 inches to 0; partially decomposed twigs and needles.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) gravelly loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, friable, slightly sticky and slightly plastic; many fine roots and common medium and coarse roots; 20 percent pebbles; slightly acid (pH 6.4); clear smooth boundary.

E—4 to 11 inches; pale brown (10YR 6/3) very gravelly coarse sandy loam, brown (10YR 5/3) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and medium roots and few coarse roots; 40 percent pebbles; slightly acid (pH 6.2); abrupt smooth boundary.

Bw1—11 to 19 inches; light yellowish brown (10YR 6/4) very gravelly coarse sandy loam, yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and medium roots and few coarse roots; common very fine, fine, and medium pores; 35 percent pebbles; moderately acid (pH 5.6); clear wavy boundary.

Bw2—19 to 34 inches; very pale brown (10YR 7/4) very gravelly sandy clay loam, yellowish brown (10YR 5/6) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and moderately plastic; few fine, medium, and coarse roots; common very fine, fine, and medium pores; 55 percent pebbles; strongly acid (pH 5.4); clear wavy boundary.

BC—34 to 60 inches; brownish yellow (10YR 6/6) extremely gravelly coarse sandy loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and moderately plastic; few fine, medium, and coarse roots; common very fine, fine, and medium pores; 10 percent cobbles and 55 percent pebbles; strongly acid (pH 5.2).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Percent of surface covered by stones or boulders:* 0 to 3 percent

*A horizon:*

Value—3 or 4 dry; 2 or 3 moist  
 Chroma—2 or 3  
 Clay content—15 to 25 percent  
 Content of rock fragments—15 to 35 percent (0 to 10 percent cobbles and stones, 15 to 25 percent pebbles)  
 Reaction—pH 6.1 to 7.3

*E horizon:*

Value—6 or 7 dry; 4 or 5 moist  
 Chroma—2 or 3  
 Texture—sandy loam, coarse sandy loam, or sandy clay loam  
 Clay content—15 to 25 percent  
 Content of rock fragments—15 to 45 percent (0 to 10 percent cobbles and stones, 15 to 40 percent pebbles)  
 Reaction—pH 6.1 to 7.3

*Bw horizon:*

Value—5, 6, or 7 dry; 4, 5, or 6 moist  
 Chroma—3, 4, or 6  
 Texture—sandy loam, coarse sandy loam, or sandy clay loam  
 Clay content—18 to 30 percent  
 Content of rock fragments—35 to 60 percent (0 to 20 percent cobbles and stones, 30 to 55 percent pebbles)  
 Reaction—pH 5.1 to 6.5

*BC horizon:*

Value—6, 7, or 8 dry; 4, 5, or 6 moist  
 Chroma—4 or 6  
 Texture—loamy sand, loamy coarse sand, sandy loam, or coarse sandy loam  
 Clay content—5 to 18 percent  
 Content of rock fragments—35 to 70 percent (5 to 25 percent cobbles and stones, 30 to 55 percent pebbles)  
 Reaction—pH 5.1 to 6.5

## **Kalsted Series**

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Remnant stream terraces, alluvial fans, escarpments, ridges, and side slopes of hills

*Parent material:* Alluvium and colluvium

*Slope range:* 0 to 60 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Coarse-loamy, mixed, superactive, frigid Aridic Calcustepts

### **Typical Pedon**

Kalsted gravelly sandy loam, 4 to 15 percent slopes, stony, in rangeland, 1,350 feet south and 850 feet east of the northwest corner of sec. 28, T. 4 N., R. 2 W.

A—0 to 3 inches; brown (10YR 4/3) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; 5 percent rounded cobbles and 20 percent rounded pebbles; slightly alkaline (pH 7.4); clear wavy boundary.

Bk1—3 to 18 inches; light gray (10YR 7/2) gravelly sandy loam, grayish brown (10YR 5/2) moist; moderate medium prismatic structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; many fine pores; 5 percent rounded cobbles and 20 percent rounded pebbles; disseminated lime, common fine and medium threads and masses of lime, common faint lime coatings on undersides of fragments; violently effervescent; moderately alkaline (pH 8.2); gradual wavy boundary.

Bk2—18 to 30 inches; pale brown (10YR 6/3) gravelly sandy loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine pores; 5 percent rounded cobbles and 25 percent rounded pebbles; disseminated lime, common fine and medium threads and masses of lime, common distinct lime coatings on fragments; violently effervescent; moderately alkaline (pH 8.4); gradual wavy boundary.

Bk3—30 to 60 inches; light brownish gray (10YR 6/2) gravelly sandy loam stratified with thin lenses of loamy sand, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few very fine roots; common very fine pores; 30 percent rounded pebbles; disseminated lime, many fine and medium masses of lime, continuous distinct lime coatings on fragments; violently effervescent; moderately alkaline (pH 8.4).

### **Range in Characteristics**

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches

*Depth to Bk horizon:* 5 to 12 inches

*Percent of surface covered by stones:* 0 to 0.1 percent

*A horizon:*

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2 or 3

Clay content—5 to 18 percent

Content of rock fragments—5 to 35 percent (0 to 10 percent cobbles, 5 to 25 percent pebbles)

Calcium carbonate equivalent—0 to 10 percent

Reaction—pH 7.4 to 8.4

*Bk1 and Bk2 horizons:*

Value—6, 7, or 8 dry; 5, 6, or 7 moist

Chroma—2 or 3

Clay content—5 to 18 percent

Content of rock fragments—5 to 35 percent (0 to 5 percent cobbles, 5 to 30 percent pebbles)

Calcium carbonate equivalent—15 to 30 percent

Reaction—pH 7.4 to 8.4

*Bk3 horizon:*

Value—6, 7, or 8 dry; 5, 6, or 7 moist

Chroma—2, 3, or 4

Texture—sandy loam stratified with more than 50 percent fine and coarser sand

Clay content—5 to 15 percent

Content of rock fragments—5 to 35 percent (0 to 5 percent cobbles, 5 to 30 percent pebbles)

Calcium carbonate equivalent—15 to 30 percent

Reaction—pH 7.9 to 8.4

## Kellygulch Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Divides, escarpments, ridges, and side slopes of hills

*Parent material:* Local colluvium, slope alluvium, and residuum derived from granite

*Slope range:* 8 to 70 percent

*Elevation range:* 4,500 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Coarse-loamy, mixed, superactive, frigid Typic Haplustepts

### Typical Pedon

Kellygulch coarse sandy loam, very bouldery, in an area of Lumpgulch, very bouldery-Rock outcrop-Kellygulch,

very bouldery, complex, 25 to 60 percent slopes; in a forested area, 1,900 feet north and 2,700 feet east of the southwest corner of sec. 29, T. 9 N., R. 2 W.

Oi—2 inches to 0; partially decomposed needles, twigs, and leaves.

A—0 to 5 inches; grayish brown (10YR 5/2) coarse sandy loam, dark grayish brown (10YR 4/2) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine roots and few fine and medium roots; many very fine and fine pores and few medium pores; 10 percent granite pebbles; slightly acid (pH 6.1); clear smooth boundary.

Bw—5 to 13 inches; brown (10YR 5/3) coarse sandy loam, brown (10YR 4/3) moist; weak coarse subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine roots and few fine and medium roots; many very fine and few fine pores; 10 percent granite pebbles; neutral (pH 6.7); clear wavy boundary.

BC—13 to 27 inches; light brownish gray (2.5Y 6/2) gravelly coarse sandy loam, grayish brown (2.5Y 5/2) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common very fine roots and few fine and medium roots; many very fine and few fine pores; 20 percent granite pebbles; neutral (pH 6.6); clear wavy boundary.

Cr—27 to 31 inches; pale olive (5Y 6/3), decomposed granite bedrock (grus) that crushes to very gravelly coarse sand or loamy coarse sand.

R—31 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Cr horizon:* 20 to 38 inches

*Depth to R layer:* 23 to 40 inches

*Percent of surface covered by stones or boulders:* 0 to 15 percent

*A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry

Chroma—1 or 2

Texture—coarse sandy loam or sandy loam

Clay content—10 to 18 percent

Content of rock fragments—5 to 50 percent (0 to 25 percent cobbles and stones, 5 to 25 percent pebbles)

Reaction—pH 6.1 to 7.3

*Bw horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist  
 Chroma—2 or 3  
 Texture—coarse sandy loam or sandy loam  
 Clay content—10 to 18 percent  
 Content of rock fragments—10 to 30 percent pebbles  
 Reaction—pH 6.1 to 7.3

*BC horizon:*

Hue—10YR or 2.5Y  
 Value—5 or 6 dry; 4 or 5 moist  
 Chroma—2, 3, or 4  
 Texture—coarse sandy loam or sandy loam  
 Clay content—10 to 18 percent  
 Content of rock fragments—10 to 35 percent pebbles  
 Reaction—pH 6.1 to 7.3

## Kimpton Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Ridges and side slopes of mountains

*Parent material:* Local colluvium, slope alluvium, and residuum derived from hard, fine grained sandstone or fine grained igneous rock

*Slope range:* 15 to 50 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Ustic Haplocryalfs

### Typical Pedon

Kimpton very cobbly loam, in an area of Kimpton, very bouldery-Rock outcrop-Tiban, very bouldery, complex, 25 to 50 percent slopes; in a forested area, 300 feet south and 150 feet east of the northwest corner of sec. 4, T. 5 N., R. 2 W.

Oi—1 inch to 0; partially decomposed needles, twigs, and leaves.

A—0 to 4 inches; dark grayish brown (10YR 4/2) very cobbly loam, dark brown (10YR 3/3) moist; moderate medium granular structure; soft, very friable, slightly sticky and nonplastic; common very fine and fine roots and few medium roots; 20 percent angular cobbles and 25 percent angular pebbles; neutral (pH 6.6); clear wavy boundary.

E—4 to 6 inches; grayish brown (10YR 5/2) very cobbly loam, brown (10YR 4/3) moist; moderate

medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium roots; 20 percent angular cobbles and 20 percent angular pebbles; slightly acid (pH 6.4); clear wavy boundary.

Bt—6 to 13 inches; brown (10YR 5/3) very cobbly clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common very fine and fine roots; common medium pores; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds and bridging sand grains; 20 percent angular cobbles and 25 percent angular pebbles; neutral (pH 6.8); clear wavy boundary.

Bk—13 to 32 inches; pale brown (10YR 6/3) very cobbly loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common very fine and fine roots; common very fine and fine pores; 25 percent angular cobbles and 25 percent angular pebbles; disseminated lime, common fine and medium masses and threads of lime, common distinct lime coatings on undersides of fragments; strongly effervescent; slightly alkaline (pH 7.8); clear smooth boundary.

R—32 inches; hard, fine grained sandstone bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bt horizon:* 6 to 10 inches

*Depth to Bk horizon:* 11 to 20 inches

*Depth to bedrock:* 20 to 40 inches

*Percent of surface covered by stones or boulders:* 0.1 to 3.0 percent

*A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 3 or 4 moist

Chroma—2 or 3

Clay content—15 to 27 percent

Content of rock fragments—35 to 50 percent (0 to 5 percent stones, 10 to 20 percent cobbles, 25 to 30 percent pebbles)

Reaction—pH 6.1 to 7.3

*E horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2 or 3

Texture—loam or fine sandy loam

Clay content—15 to 27 percent

Content of rock fragments—25 to 55 percent (0 to 10 percent stones, 10 to 20 percent cobbles, 15 to 35 percent pebbles)

Reaction—pH 6.1 to 7.3

*Bt horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 3, 4, or 5 moist

Chroma—2 or 3

Texture—loam, sandy clay loam, or clay loam

Clay content—23 to 35 percent

Content of rock fragments—35 to 60 percent (0 to 5 percent stones, 10 to 20 percent cobbles, 25 to 40 percent pebbles)

Reaction—pH 6.6 to 7.3

*Bk horizon:*

Hue—10YR or 2.5Y

Value—6 or 7 dry; 5 or 6 moist

Chroma—2 or 3

Texture—loam, sandy clay loam, or fine sandy loam

Clay content—15 to 27 percent

Content of rock fragments—35 to 60 percent (0 to 5 percent stones, 10 to 25 percent cobbles, 25 to 40 percent pebbles)

Calcium carbonate equivalent—12 to 25 percent

Reaction—pH 7.4 to 8.4

## Kobarter Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Slow (0.06 to 0.2 inch per hour)

*Landform:* Alluvial fans, knolls, and side slopes of hills

*Parent material:* Slope alluvium derived mainly from semiconsolidated shale and siltstone

*Slope range:* 2 to 35 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine, mixed, superactive, frigid Aridic Haplustepts

### Typical Pedon

Kobarter clay loam, 8 to 15 percent slopes, in rangeland, 500 feet west and 600 feet south of the northeast corner of sec. 10, T. 3 N., R. 1 W.

A—0 to 5 inches; brown (10YR 5/3) clay loam, dark grayish brown (10YR 4/2) moist; moderate medium granular structure; slightly hard, friable, slightly sticky and moderately plastic; common fine

and very fine roots; 10 percent rounded pebbles; moderately alkaline (pH 8.0); clear smooth boundary.

Bw—5 to 18 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 5/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, firm, moderately sticky and moderately plastic; common fine and very fine roots; many fine and very fine pores; 5 percent rounded pebbles; disseminated lime; violently effervescent; moderately alkaline (pH 8.4); gradual smooth boundary.

Bkz—18 to 48 inches; very pale brown (10YR 7/4) silty clay, light yellowish brown (2.5Y 6/4) moist; weak medium prismatic structure parting to moderate medium subangular blocky; very hard, firm, moderately sticky and moderately plastic; few fine and very fine roots; common fine and very fine pores; 5 percent rounded pebbles; disseminated lime, common fine threads of lime; few fine threads of soluble salts; strongly effervescent; moderately alkaline (pH 8.2); gradual smooth boundary.

Bz—48 to 60 inches; pale brown (10YR 6/3) silty clay, brown (10YR 5/3) moist; massive; very hard, firm, moderately sticky and moderately plastic; few very fine roots; few very fine pores; 5 percent rounded pebbles; few fine threads of soluble salts; slightly effervescent; moderately alkaline (pH 8.0).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bkz horizon:* 10 to 22 inches

*A horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 3 or 4 moist

Chroma—2 or 3

Clay content—27 to 40 percent

Content of rock fragments—0 to 35 percent (0 to 10 percent cobbles, 0 to 25 percent pebbles)

Reaction—pH 7.4 to 8.4

*Bw horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2 or 3

Texture—clay loam, silty clay loam, silty clay, or clay

Clay content—30 to 45 percent

Content of rock fragments—0 to 5 percent pebbles

Calcium carbonate equivalent—2 to 10 percent

Reaction—pH 7.4 to 8.4

**Bkz horizon:**

Hue—10YR or 2.5Y  
 Value—6 or 7 dry; 4, 5, or 6 moist  
 Chroma—2, 3, or 4  
 Texture—clay loam, silty clay loam, silty clay, or clay  
 Clay content—35 to 45 percent  
 Content of rock fragments—0 to 5 percent pebbles  
 Calcium carbonate equivalent—3 to 15 percent  
 Electrical conductivity—2 to 8 mmhos/cm  
 Reaction—pH 7.4 to 9.0

**Bz horizon:**

Hue—10YR or 2.5Y  
 Value—6 or 7 dry; 4 or 5 moist  
 Chroma—2, 3, or 4  
 Texture—clay loam, silty clay loam, silty clay, or clay  
 Clay content—35 to 45 percent  
 Content of rock fragments—0 to 5 percent pebbles  
 Electrical conductivity—4 to 16 mmhos/cm  
 Calcium carbonate equivalent—2 to 10 percent  
 Reaction—pH 7.4 to 9.0

**Kokoruda Series**

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderately slow (0.2 to 0.6 inch per hour)

*Landform:* Alluvial fans, swales, and side slopes of hills

*Parent material:* Alluvium derived from mixed rock sources

*Slope range:* 8 to 35 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 22 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 90 to 105 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Typic Argiustolls

**Typical Pedon**

Kokoruda loam, in an area of Kokoruda-Elmark, very bouldery-Rock outcrop complex, 8 to 35 percent slopes; in a forested area, 2,600 feet south and 150 feet east of the northwest corner of sec. 30, T. 9 N., R. 2 W.

Oi—1 inch to 0; partially decomposed leaves, twigs, needles, and roots.

A1—0 to 5 inches; dark gray (10YR 4/1) loam, very dark gray (10YR 3/1) moist; weak medium and fine subangular blocky structure; soft, very friable,

moderately sticky and slightly plastic; many very fine roots and few fine, medium, and coarse roots; many very fine and few fine pores; 10 percent rounded pebbles; slightly acid (pH 6.2); clear wavy boundary.

A2—5 to 11 inches; dark gray (10YR 4/1) cobbly loam, very dark gray (10YR 3/1) moist; weak medium and fine subangular blocky structure; soft, very friable, moderately sticky and slightly plastic; many very fine roots and few fine, medium, and coarse roots; 15 percent rounded cobbles and 15 percent rounded pebbles; slightly acid (pH 6.1); clear smooth boundary.

Bt1—11 to 15 inches; pale brown (10YR 6/3) cobbly clay loam, brown (10YR 5/3) moist; weak medium prismatic structure parting to moderate medium and fine subangular blocky; slightly hard, friable, moderately sticky and slightly plastic; many very fine roots and few fine, medium, and coarse roots; many very fine and few fine pores; many faint clay films on faces of peds and bridging sand grains; 15 percent rounded cobbles and 10 percent rounded pebbles; neutral (pH 6.6); clear wavy boundary.

Bt2—15 to 33 inches; light yellowish brown (10YR 6/4) cobbly clay loam, brown (10YR 5/3) moist; moderate medium prismatic structure parting to moderate medium and fine subangular blocky; slightly hard, friable, moderately sticky and slightly plastic; many very fine roots and few fine and medium roots; many very fine and few fine pores; many faint clay films on faces of peds and bridging sand grains; 15 percent rounded cobbles and 15 percent rounded pebbles; slightly acid (pH 6.1); clear wavy boundary.

BC—33 to 60 inches; pale brown (10YR 6/3) very cobbly clay loam, light olive brown (2.5Y 5/4) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; few very fine and fine roots; common very fine and few fine pores; 20 percent rounded cobbles and 25 percent rounded pebbles; moderately acid (pH 6.0).

**Range in Characteristics**

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 15 inches

*Depth to Bt horizon:* 8 to 14 inches

**A horizon:**

Hue—10YR or 2.5Y  
 Value—3 or 4 dry; 2 or 3 moist  
 Clay content—10 to 27 percent

Content of rock fragments—10 to 35 percent (0 to 15 percent cobbles, 10 to 20 percent pebbles)  
Reaction—pH 6.1 to 7.3

**Bt horizon:**

Hue—10YR or 2.5Y  
Value—5 or 6 dry; 3, 4, or 5 moist  
Chroma—2, 3, or 4  
Texture—sandy clay loam, loam, or clay loam  
Clay content—18 to 35 percent  
Content of rock fragments—10 to 35 percent (0 to 15 percent cobbles, 10 to 20 percent pebbles)  
Reaction—pH 6.1 to 7.3

**BC horizon:**

Hue—10YR or 2.5Y  
Value—5 or 6 dry; 4 or 5 moist  
Chroma—3, 4, or 6  
Texture—sandy loam, sandy clay loam, loam, or clay loam  
Clay content—15 to 30 percent  
Content of rock fragments—20 to 50 percent (0 to 20 percent cobbles, 20 to 30 percent pebbles)  
Reaction—pH 5.6 to 7.3

**Kounter Series**

*Depth class:* Shallow (10 to 20 inches)  
*Drainage class:* Somewhat excessively drained  
*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)  
*Landform:* Ridges and side slopes of hills  
*Parent material:* Residuum derived from granite  
*Slope range:* 4 to 45 percent  
*Elevation range:* 4,400 to 6,000 feet  
*Annual precipitation:* 15 to 19 inches  
*Annual air temperature:* 36 to 40 degrees F  
*Frost-free period:* 80 to 95 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Lithic Haplustepts

**Typical Pedon**

Kounter very cobbly coarse sandy loam, in an area of Rock outcrop-Kounter, very bouldery-Jeffcity, bouldery, complex, 15 to 45 percent slopes, in rangeland, 1,150 feet north and 1,175 feet east of the southwest corner of sec. 17, T. 1 N., R. 5 W.

A—0 to 2 inches; dark grayish brown (10YR 4/2) very cobbly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots and few medium roots; 20 percent rounded

granite cobbles and 15 percent granite pebbles; neutral (pH 6.8); clear wavy boundary.

Bw—2 to 7 inches; brown (10YR 5/3) very gravelly coarse sandy loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and common fine roots; many very fine and fine pores; 15 percent rounded granite cobbles and 30 percent granite pebbles; disseminated lime, few faint lime coatings on undersides of fragments; slightly effervescent; slightly alkaline (pH 7.4); clear wavy boundary.

Bk—7 to 14 inches; light brownish gray (10YR 6/2) very gravelly coarse sandy loam, brown (10YR 5/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; 10 percent rounded granite cobbles and 35 percent granite pebbles; disseminated lime, common fine masses and threads of lime, common distinct lime coatings around fragments; violently effervescent; moderately alkaline (pH 8.2); clear smooth boundary.

Cr—14 to 17 inches; light gray (10YR 7/1), decomposed granite bedrock (grus) that crushes to loamy coarse sand.

R—17 inches; hard, light gray (10YR 7/1) granite bedrock.

**Range in Characteristics**

*Soil temperature:* 38 to 42 degrees F  
*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the lithic contact (if it occurs at a depth of less than 12 inches)  
*Depth to Bk horizon:* 6 to 10 inches  
*Depth to Cr horizon:* 10 to 18 inches  
*Depth to R layer:* 12 to 20 inches  
*Percent of surface covered by stones or boulders:* 0.01 to 3.0 percent

**A horizon:**

Hue—10YR or 2.5Y  
Value—4 or 5 dry; 3 or 4 moist  
Chroma—2 or 3  
Clay content—10 to 20 percent  
Content of rock fragments—15 to 50 percent (0 to 5 percent stones, 5 to 20 percent cobbles, 10 to 30 percent pebbles)  
Reaction—pH 6.1 to 7.3

**Bw horizon:**

Hue—10YR or 2.5Y  
Value—5 or 6 dry; 4 or 5 moist  
Chroma—2, 3, or 4

Texture—coarse sandy loam or sandy loam  
 Clay content—8 to 18 percent  
 Content of rock fragments—35 to 60 percent (0 to 5 percent stones, 5 to 15 percent cobbles, 30 to 40 percent pebbles)  
 Calcium carbonate equivalent—0 to 5 percent  
 Reaction—pH 6.6 to 7.8

*Bk horizon:*

Hue—10YR or 2.5Y  
 Value—6 or 7 dry; 5 or 6 moist  
 Chroma—2, 3, or 4  
 Texture—coarse sandy loam or sandy loam  
 Clay content—5 to 18 percent  
 Content of rock fragments—35 to 70 percent (0 to 5 percent stones, 0 to 20 percent cobbles, 35 to 45 percent pebbles)  
 Calcium carbonate equivalent—15 to 25 percent  
 Reaction—pH 7.4 to 8.4

## Kurrie Series

*Depth class:* Deep (40 to 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, ridges, and side slopes of mountains

*Parent material:* Slope alluvium and colluvium derived from granitic rock deposited over granite bedrock

*Slope range:* 15 to 60 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Ustic Glossocryalfs

### Typical Pedon

Kurrie very cobbly sandy loam, in an area of Releep, very bouldery-Kurrie, very bouldery-Rock outcrop complex, 15 to 35 percent slopes; in a forested area, 2,100 feet south and 1,500 feet west of the northeast corner of sec. 18, T. 9 N., R. 3 W.

Oi—2 inches to 0; partially decomposed needles, twigs, and leaves.

A—0 to 4 inches; brown (10YR 5/3) very cobbly sandy loam, dark brown (10YR 3/3) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots and few fine and medium roots; many very fine and fine pores; 20 percent cobbles

and 15 percent pebbles; neutral (pH 6.6); clear wavy boundary.

E—4 to 9 inches; light gray (2.5Y 7/2) very cobbly sandy loam, grayish brown (2.5Y 5/2) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine, common fine, and few medium and coarse roots; many very fine and fine pores; 5 percent stones, 20 percent cobbles, and 10 percent pebbles; slightly acid (pH 6.1); clear wavy boundary.

E/Bt—9 to 23 inches; 80 percent light gray (2.5Y 7/2) very cobbly sandy loam, grayish brown (2.5Y 5/2) moist (E part); 20 percent light yellowish brown (2.5Y 6/4) very cobbly sandy clay loam, olive brown (2.5Y 4/4) moist (Bt part); weak medium and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots and few fine, medium, and coarse roots; many very fine and fine pores; many faint clay films bridging sand grains in the Bt part; 5 percent stones, 30 percent cobbles, and 10 percent pebbles; slightly acid (pH 6.3); clear wavy boundary.

Bt—23 to 41 inches; light yellowish brown (2.5Y 6/4) very cobbly sandy clay loam, olive brown (2.5Y 4/4) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; common very fine roots and few fine, medium, and coarse roots; many very fine and few fine pores; many faint clay films bridging sand grains; 30 percent cobbles and 10 percent pebbles; slightly acid (pH 6.5); clear wavy boundary.

BC—41 to 46 inches; grayish brown (2.5Y 5/2) gravelly coarse sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; soft, very friable, slightly sticky and nonplastic; common very fine and few fine roots; many very fine and few fine tubular and interstitial pores; 20 percent pebbles; neutral (pH 6.8); clear wavy boundary.

Cr—46 to 53 inches; light brownish gray (2.5Y 6/2), decomposed granite bedrock (grus) that crushes to gravelly coarse sand.

R—53 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bt horizon:* 9 to 28 inches

*Depth to Cr horizon:* 40 to 58 inches

*Depth to R layer:* 43 to 60 inches

*Percent of surface covered by stones or boulders:* 0.01 to 3.0 percent

*A horizon:*

Hue—10YR or 2.5Y  
 Value—4, 5, or 6 dry; 3, 4, or 5 moist  
 Chroma—2, 3, or 4  
 Texture—coarse sandy loam or sandy loam  
 Clay content—10 to 20 percent  
 Content of rock fragments—10 to 60 percent (0 to 10 percent stones, 0 to 25 percent cobbles, 10 to 25 percent pebbles)  
 Reaction—pH 6.1 to 7.3

*E horizon:*

Hue—10YR or 2.5Y  
 Value—6, 7, or 8 dry; 4, 5, or 6 moist  
 Chroma—1, 2, or 3  
 Texture—coarse sandy loam, sandy loam, or sandy clay loam  
 Clay content—10 to 25 percent  
 Content of rock fragments—20 to 60 percent (0 to 10 percent stones, 10 to 30 percent cobbles, 10 to 20 percent pebbles)  
 Reaction—pH 6.1 to 7.3

*E/Bt horizon:*

Hue—10YR or 2.5Y  
 Value—6, 7 or 8 dry, 4, 5, or 6 moist (E part); 4, 5, or 6 dry, 3, 4, or 5 moist (Bt part)  
 Chroma—1, 2, 3, or 4 (E part); 2, 3, or 4 (Bt part)  
 Texture (mixed)—coarse sandy loam, sandy loam, or sandy clay loam  
 Clay content—10 to 25 percent  
 Content of rock fragments—20 to 60 percent (0 to 10 percent stones, 10 to 30 percent cobbles, 10 to 20 percent pebbles)  
 Reaction—pH 6.1 to 7.3

*Bt horizon:*

Hue—10YR or 2.5Y  
 Value—4, 5, or 6 dry; 3, 4, or 5 moist  
 Chroma—2, 3, or 4  
 Texture—sandy loam, sandy clay loam, or clay loam  
 Clay content—18 to 30 percent  
 Content of rock fragments—35 to 60 percent (0 to 5 percent stones, 25 to 35 percent cobbles, 10 to 20 percent pebbles)  
 Reaction—pH 6.1 to 7.3

*BC horizon:*

Hue—10YR or 2.5Y  
 Value—5 or 6 dry; 4 or 5 moist  
 Chroma—2, 3, or 4  
 Texture—coarse sandy loam or sandy loam  
 Clay content—10 to 18 percent

Content of rock fragments—20 to 50 percent (0 to 10 percent cobbles, 20 to 40 percent pebbles)  
 Reaction—pH 6.1 to 7.3

## Lahood Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, ridges, and side slopes of mountains

*Parent material:* Slope alluvium, colluvium, and residuum over sandstone or fine grained igneous rock

*Slope range:* 2 to 45 percent

*Elevation range:* 4,000 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Coarse-loamy, mixed, superactive, frigid Aridic Haplustolls

### Typical Pedon

Lahood loam, 2 to 8 percent slopes, in rangeland, 200 feet north and 1,950 feet west of the southeast corner of sec. 8, T. 1 N., R. 1 W.

A—0 to 3 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; 5 percent pebbles; slightly alkaline (pH 7.8); abrupt smooth boundary.

Bw—3 to 11 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate medium and coarse prismatic structure; hard, firm, moderately sticky and moderately plastic; many fine and very fine roots; common fine pores; 5 percent pebbles; moderately alkaline (pH 8.4); abrupt smooth boundary.

Bk1—11 to 22 inches; very pale brown (10YR 7/3) sandy loam, brown (10YR 5/3) moist; weak fine and medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; common fine roots; few or common fine pores; 10 percent pebbles; disseminated lime, common fine and medium threads and masses of lime, common faint lime coatings on undersides of fragments; violently effervescent; moderately alkaline (pH 8.4); clear wavy boundary.

Bk2—22 to 36 inches; pale brown (10YR 6/3) gravelly sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and

nonplastic; few or common fine and very fine roots; few fine pores; 25 percent pebbles; disseminated lime, common fine and medium threads and masses of lime, common distinct lime coatings on fragments; violently effervescent; moderately alkaline (pH 8.4); clear smooth boundary.

R—36 inches; hard, brown (10YR 4/3), coarse grained sandstone.

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches

*Thickness of the mollic epipedon:* 7 to 14 inches

*Depth to Bk horizon:* 10 to 15 inches

*Depth to bedrock:* 20 to 40 inches

*Percent of surface covered by stones:* 0 to 0.1 percent

#### A horizon:

Hue—10YR or 7.5YR

Chroma—2 or 3

Clay content—10 to 18 percent

Content of rock fragments—0 to 35 percent (0 to 10 percent cobbles and stones, 0 to 25 percent pebbles)

Reaction—pH 7.4 to 8.4

#### Bw horizon:

Hue—10YR or 7.5YR

Value—5 or 6 dry; 3 or 4 moist

Chroma—2 or 3

Texture—loam or sandy loam

Clay content—10 to 18 percent

Content of rock fragments—0 to 35 percent (0 to 10 percent cobbles and stones, 0 to 25 percent pebbles)

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 7.9 to 8.4

#### Bk horizon:

Value—6 or 7 dry; 5 or 6 moist

Texture—loam, coarse sandy loam, or sandy loam

Clay content—5 to 18 percent

Content of rock fragments—5 to 35 percent (0 to 10 percent cobbles and stones, 5 to 25 percent pebbles)

Calcium carbonate equivalent—15 to 30 percent

Reaction—pH 7.9 to 9.0

### Lap Series

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, divides, ridges, and side slopes of hills

*Parent material:* Local colluvium and residuum derived from limestone

*Slope range:* 4 to 70 percent

*Elevation range:* 4,000 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 39 to 45 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, carbonatic, frigid Lithic Calciustolls

### Typical Pedon

Lap very gravelly loam, in an area of Maiden-Lap-Windham complex, 35 to 60 percent slopes, in rangeland, 1,250 feet west and 800 feet south of the northeast corner of sec. 4, T. 1 N., R. 1 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) very gravelly loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; 5 percent angular cobbles and 40 percent angular limestone pebbles; disseminated lime; slightly effervescent; slightly alkaline (pH 7.6); clear smooth boundary.

Bk1—4 to 7 inches; brown (10YR 5/3) extremely gravelly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; 10 percent angular cobbles and 55 percent angular limestone pebbles; disseminated lime, common fine and medium threads and masses of lime, common distinct lime coatings on fragments; violently effervescent; moderately alkaline (pH 8.0); clear wavy boundary.

Bk2—7 to 18 inches; light brownish gray (10YR 6/2) extremely gravelly loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; common very fine and fine roots; common very fine pores; 15 percent angular limestone cobbles and 60 percent angular limestone pebbles; disseminated lime, common fine and medium threads and masses of lime, many prominent lime casts around fragments; violently effervescent; moderately alkaline (pH 8.4); clear smooth boundary.

R—18 inches; hard limestone bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the

lithic contact (if it occurs at a depth of less than 12 inches)

*Thickness of the mollic epipedon:* 7 to 9 inches

*Depth to bedrock:* 10 to 20 inches

*Percent of surface covered by stones or boulders:* 0 to 3 percent

*A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 2 or 3 moist

Chroma—2 or 3

Clay content—18 to 27 percent

Content of rock fragments—35 to 60 percent (0 to 40 percent cobbles and stones, 25 to 45 percent pebbles or channers)

Calcium carbonate equivalent—3 to 15 percent in the particle-size fraction less than 2 mm and more than 40 percent in the particle-size fraction less than 20 mm

Reaction—pH 6.6 to 7.8

*Bk horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 3, 4, or 5 moist

Chroma—2 or 3

Clay content—15 to 27 percent

Content of rock fragments—35 to 70 percent (0 to 30 percent cobbles and stones, 30 to 60 percent channers or pebbles)

Calcium carbonate equivalent—40 to 60 percent in the particle-size fraction less than 2 mm and more than 40 percent in the particle-size fraction less than 20 mm

Reaction—pH 7.9 to 9.0

## Ledger Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Somewhat poorly drained

*Permeability:* Very slow (less than 0.06 inch per hour)

*Landform:* Flood plains, flood-plain steps, and drainageways

*Parent material:* Saline and sodic alluvium derived from mixed rock sources

*Slope range:* 0 to 2 percent

*Elevation range:* 3,800 to 5,400 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine, mixed, superactive, calcareous, frigid Oxyaquic Ustifluvents

### Typical Pedon

Ledger silty clay loam, in an area of Ledger-Moltoner-

Mckenton complex, 0 to 2 percent slopes, in pasture, 2,100 feet south and 2,600 feet east of the northwest corner of sec. 33, T. 2 N., R. 4 W.

Az1—0 to 3 inches; light brownish gray (10YR 6/2) silty clay loam, brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; disseminated lime; common very fine threads and masses of soluble salt; strongly effervescent; moderately alkaline (pH 8.4); abrupt smooth boundary.

Az2—3 to 7 inches; light brownish gray (10YR 6/2) silty clay loam, brown (10YR 4/3) moist; moderate thin and medium platy structure; slightly hard, very friable, moderately sticky and moderately plastic; many very fine and fine roots and few medium roots; many very fine and fine tubular pores and few medium tubular pores; disseminated lime; common very fine and fine masses and threads of soluble salt; strongly effervescent; moderately alkaline (pH 8.4); clear wavy boundary.

Cz1—7 to 16 inches; light gray (10YR 7/2) silty clay loam, grayish brown (10YR 5/2) moist; moderate thick platy structure; slightly hard, very friable, moderately sticky and moderately plastic; many very fine and fine roots; many very fine and fine tubular pores; disseminated lime; few very fine masses and threads of soluble salt; strongly effervescent; strongly alkaline (pH 9.0); clear wavy boundary.

Cz2—16 to 25 inches; gray (10YR 5/1) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; hard, firm, moderately sticky and moderately plastic; few very fine roots; common very fine and fine tubular pores; disseminated lime; common very fine and fine masses and threads of soluble salt; strongly effervescent; moderately alkaline (pH 8.4); clear wavy boundary.

Ckzg1—25 to 34 inches; grayish brown (10YR 5/2) silty clay loam, dark gray (10YR 4/1) moist; common faint very dark gray (5Y 3/1) redox depletions; few faint strong brown (7.5YR 5/6) redox concentrations; moderate fine subangular blocky structure; hard, firm, moderately sticky and moderately plastic; few very fine roots; common very fine tubular pores; disseminated lime, few very fine masses and threads of lime; common very fine and fine masses and threads of soluble salt; strongly effervescent; moderately alkaline (pH 8.2); gradual wavy boundary.

Ckzg2—34 to 60 inches; light brownish gray (10YR 6/2) silty clay loam, dark grayish brown (10YR 4/2)

moist; common faint dark gray (5Y 4/1) redox depletions; massive; very hard, very firm, moderately sticky and moderately plastic; few very fine roots; disseminated lime, few fine and medium masses and threads of lime; common fine masses and threads of soluble salt; slightly effervescent; moderately alkaline (pH 8.3).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to seasonal high water table:* 24 to 42 inches for extended periods during spring and early summer

*Az horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 2, 3, or 4 moist

Chroma—1, 2, 3, or 4

Texture—silt loam or silty clay loam

Clay content—15 to 40 percent

Electrical conductivity—8 to 20 mmhos/cm

Sodium adsorption ratio—13 to 30

Calcium carbonate equivalent—3 to 10 percent

Reaction—pH 7.9 to 9.6

*Cz1 and Cz2 horizons:*

Hue—10YR, 2.5Y, or 5Y

Value—5, 6, or 7 dry; 3, 4, or 5 moist

Chroma—1, 2, or 3

Texture—silty clay loam, clay loam, or clay with thin strata of loamy very fine sand, loam, or silt loam

Clay content—35 to 45 percent

Electrical conductivity—8 to 20 mmhos/cm

Sodium adsorption ratio—13 to 30

Calcium carbonate equivalent—10 to 20 percent

Reaction—pH 7.9 to 9.6

*Ckzg horizon:*

Hue—10YR, 2.5Y, or 5Y

Value—4, 5, 6, or 7 dry; 3, 4, or 5 moist

Chroma—1 or 2

Texture—silty clay loam, clay loam, or clay with thin strata of loamy very fine sand, loam, or silt loam

Clay content (weighted average)—25 to 45 percent

Electrical conductivity—8 to 16 mmhos/cm

Sodium adsorption ratio—13 to 30

Calcium carbonate equivalent—15 to 25 percent

Reaction—pH 7.9 to 9.6

### Libeg Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, outwash terraces, and side slopes of mountains and mountain valleys

*Parent material:* Colluvium, alluvium, and till derived from mixed rock sources

*Slope range:* 1 to 70 percent

*Elevation range:* 5,500 to 7,500 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Ustic Argicryolls

### Typical Pedon

Libeg very gravelly loam, 15 to 35 percent slopes, bouldery, in rangeland, 300 feet east and 300 feet south of the northwest corner of sec. 6, T. 5 N., R. 3 W.

A—0 to 10 inches; dark grayish brown (10YR 4/2) very gravelly loam, black (10YR 2/1) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; 10 percent rounded cobbles and 30 percent rounded pebbles; slightly acid (pH 6.4); clear smooth boundary.

Bt1—10 to 17 inches; brown (10YR 5/3) very gravelly clay loam, brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, moderately sticky and slightly plastic; many very fine and fine roots and common medium roots; many very fine pores; common faint clay films on faces of peds; 20 percent rounded cobbles and 40 percent rounded pebbles; neutral (pH 6.6); clear wavy boundary.

Bt2—17 to 31 inches; light yellowish brown (10YR 6/4) very cobbly clay loam, dark yellowish brown (10YR 4/4) moist; moderate fine subangular blocky structure; hard, friable, moderately sticky and moderately plastic; many very fine and fine roots and common medium roots; many very fine pores; many distinct clay films on faces of peds and bridging sand grains; 25 percent rounded cobbles and 35 percent rounded pebbles; neutral (pH 6.6); gradual wavy boundary.

Bt3—31 to 60 inches; light yellowish brown (10YR 6/4) extremely cobbly clay loam, yellowish brown (10YR 5/4) moist; weak fine subangular blocky

structure; hard, friable, moderately sticky and moderately plastic; common very fine and fine roots; common very fine pores; common distinct clay films on faces of peds and bridging sand grains; 25 percent rounded cobbles and 40 percent rounded pebbles; neutral (pH 6.7).

### Range in Characteristics

*Soil temperature:* 36 to 42 degrees F

*Thickness of the mollic epipedon:* 8 to 14 inches

*Depth to Bt horizon:* 8 to 14 inches

*Percent of surface covered by stones or boulders:* 0 to 15 percent

#### *A horizon:*

Value—3 or 4 dry; 2 or 3 moist

Chroma—1 or 2

Texture—loam or silty clay loam

Clay content—15 to 40 percent

Content of rock fragments—5 to 60 percent (0 to 50 percent stones and cobbles, 5 to 50 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *Bt1 and Bt2 horizons:*

Hue—7.5YR or 10YR

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2, 3, 4, or 6

Texture—loam, sandy clay loam, or clay loam

Clay content—15 to 35 percent

Content of rock fragments—35 to 80 percent (5 to 50 percent stones and cobbles, 10 to 45 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *Bt3 horizon:*

Hue—7.5YR or 10YR

Value—5 or 6 dry; 4 or 5 moist

Chroma—3, 4, or 6

Texture—clay loam, sandy clay loam, or sandy loam

Clay content—10 to 35 percent

Content of rock fragments—35 to 85 percent (5 to 50 percent stones and cobbles, 10 to 40 percent pebbles)

Reaction—pH 5.6 to 7.3

## Lowder Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Very poorly drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, swales, moraines, and flood-plain steps

*Parent material:* Slope alluvium and alpine glacial till derived from hard, fine grained igneous and metamorphic rocks

*Slope range:* 2 to 25 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, nonacid Typic Cryaquepts

### Typical Pedon

Lowder very cobbly loam, in an area of Lowder-Elvick very cobbly loams, 2 to 15 percent slopes, very bouldery; in a forested area, 2,300 feet north and 1,700 feet west of the southeast corner of sec. 31, T. 4 N., R. 3 W.

Oe—2 inches to 0; very dark brown (10YR 2/2) cobbly mucky peat, very dark gray (10YR 3/1) dry; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine roots and common medium roots; 5 percent rounded cobbles and 10 percent rounded pebbles; moderately acid (pH 6.0); abrupt smooth boundary.

A—0 to 2 inches; black (10YR 2/1) cobbly mucky loam, dark gray (10YR 4/1) dry; weak medium subangular blocky structure; many very fine and fine roots and common medium roots; many very fine and fine pores; 5 percent cobbles and 10 percent pebbles; slightly acid (pH 6.2); abrupt smooth boundary.

Bg1—2 to 7 inches; very dark grayish brown (10YR 3/2) very cobbly sandy clay loam, grayish brown (10YR 5/2) dry; common medium faint dark gray (5Y 4/1) redox depletions; moderate medium subangular blocky structure; hard, friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine and fine pores; 20 percent cobbles and 25 percent pebbles; slightly acid (pH 6.4); gradual wavy boundary.

Bg2—7 to 12 inches; dark grayish brown (10YR 4/2) very cobbly sandy clay loam, light brownish gray (10YR 6/2) dry; common medium faint dark gray (5Y 4/1) redox depletions and few fine faint reddish yellow (7.5YR 6/6) redox concentrations; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots and few coarse roots; many very fine and fine pores; 25 percent cobbles and 20 percent pebbles; slightly acid (pH 6.4); gradual wavy boundary.

Bg3—12 to 21 inches; dark grayish brown (2.5Y 4/2)

very cobbly coarse sandy loam, light brownish gray (10YR 6/2) dry; few medium faint very dark gray (5Y 3/1) redox depletions and common fine distinct reddish yellow (7.5YR 6/6) redox concentrations; massive; hard, firm, slightly sticky and slightly plastic; common very fine and fine roots and few coarse roots; many very fine and fine pores; 20 percent cobbles and 25 percent pebbles; slightly acid (pH 6.4); gradual irregular boundary.

Bg4—21 to 33 inches; dark brown (10YR 3/3) very gravelly sandy clay loam, light olive brown (2.5Y 5/4) dry; common distinct very dark gray (5Y 3/1) redox depletions and many distinct strong brown (7.5YR 5/8) redox concentrations; massive; hard, firm, slightly sticky and slightly plastic; few very fine, fine, and medium roots; 15 percent cobbles and 35 percent pebbles; slightly acid (pH 6.4); gradual irregular boundary.

BCg—33 to 60 inches; brown (10YR 4/3) very gravelly sandy clay loam, light olive brown (2.5Y 5/4) dry; common medium distinct very dark gray (5Y 3/1) redox depletions and few fine distinct strong brown (7.5YR 5/8) redox concentrations; massive; very hard, friable, slightly sticky and slightly plastic; few very fine, fine, and medium roots; 15 percent cobbles and 40 percent pebbles; neutral (pH 6.6).

### Range in Characteristics

*Soil temperature:* 36 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Water table:* At the surface to 12 inches below the surface from May through August

*Oe horizon:*

Hue—10YR or 2.5Y

Value—2 or 3 moist; 3 or 4 dry

Chroma—1 or 2

Content of rock fragments—10 to 35 percent (0 to 10 percent stones and cobbles, 10 to 25 percent pebbles)

Reaction—pH 5.6 to 6.5

*A horizon:*

Hue—10YR, 2.5Y, 5Y, or N

Value—2 or 3 moist; 3 or 4 dry

Chroma—0, 1, or 2

Texture—mucky silt loam or mucky loam

Clay content—15 to 27 percent

Content of rock fragments—10 to 50 percent (0 to 20 percent stones and cobbles, 10 to 30 percent pebbles)

Reaction—pH 6.1 to 6.5

*Bg1, Bg2, and Bg3 horizons:*

Hue—2.5Y or 10YR

Value—3 or 4 moist; 5 or 6 dry

Chroma—2 or 3

Texture—sandy clay loam or coarse sandy loam

Clay content—18 to 30 percent

Content of rock fragments—35 to 60 percent (15 to 25 percent stones and cobbles, 20 to 35 percent pebbles)

Reaction—pH 6.1 to 6.5

*Bg4 horizon:*

Hue—7.5YR, 10YR, or 2.5Y

Value—3, 4, or 5 moist; 5 or 6 dry

Chroma—3 or 4

Texture—coarse sandy loam or sandy clay loam

Clay content—18 to 30 percent

Content of rock fragments—35 to 75 percent (0 to 25 percent stones and cobbles, 25 to 55 percent pebbles)

Reaction—pH 6.1 to 6.5

*BCg horizon:*

Hue—7.5YR, 10YR, or 2.5Y

Value—4 or 5 moist; 5 or 6 dry

Chroma—3 or 4

Texture—coarse sandy loam, sandy loam, or sandy clay loam

Clay content—12 to 27 percent

Content of rock fragments—35 to 75 percent (0 to 25 percent stones and cobbles, 35 to 50 percent pebbles)

Reaction—pH 6.1 to 7.3

### Lowland Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans and side slopes of mountains

*Parent material:* Colluvium and slope alluvium derived from tuffaceous volcanic rocks

*Slope range:* 4 to 60 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Vitrandic Haplocryolls

### Typical Pedon

Lowland loam, 15 to 35 percent slopes, stony, in

rangeland, 1,600 feet west and 1,200 feet north of the southeast corner of sec. 17, T. 6 N., R. 6 W.

**A**—0 to 12 inches; dark gray (10YR 4/1) loam, black (10YR 2/1) moist; moderate fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; neutral (pH 6.8); clear smooth boundary.

**Bw**—12 to 20 inches; grayish brown (10YR 5/2) cobbly sandy loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common fine pores; 10 percent cobbles and 20 percent pebbles; neutral (pH 7.2); clear smooth boundary.

**BC**—20 to 38 inches; light gray (10YR 6/1) very cobbly sandy loam, dark grayish brown (10YR 4/2) moist; weak coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; common fine pores; 15 percent cobbles and 25 percent pebbles; slightly alkaline (pH 7.4); gradual wavy boundary.

**C**—38 to 60 inches; light gray (10YR 7/1) very cobbly loamy sand, grayish brown (10YR 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; 15 percent stones, 20 percent cobbles, and 20 percent pebbles; slightly alkaline (pH 7.4).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches

*Thickness of the mollic epipedon:* 8 to 16 inches

*Content of volcanic glass:* More than 30 percent in the coarse silt and sand fraction of one or more horizons (lab data pending)

*Percent of surface covered by stones or boulders:* 0 to 0.1 percent

#### *A horizon:*

Hue—10YR or 2.5Y

Value—3, 4, or 5 dry; 2 or 3 moist

Chroma—1 or 2

Texture—loam or sandy clay loam

Clay content—15 to 23 percent

Content of rock fragments—0 to 25 percent (0 to 5 percent cobbles and stones, 0 to 25 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *Bw horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—1 or 2

Texture—loam, sandy clay loam, sandy loam, or coarse sandy loam

Clay content—12 to 23 percent

Content of rock fragments—25 to 50 percent (5 to 20 percent cobbles and stones, 20 to 30 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *BC horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—1 or 2

Texture—loam, sandy loam, or coarse sandy loam

Clay content—12 to 20 percent

Content of rock fragments—35 to 60 percent (10 to 25 percent cobbles and stones, 25 to 35 percent pebbles)

Reaction—pH 6.1 to 7.8

#### *C horizon:*

Hue—10YR or 2.5Y

Value—6, 7, or 8 dry; 4, 5, or 6 moist

Chroma—1 or 2

Texture—coarse sandy loam, sandy loam, loam, or loamy sand

Clay content—5 to 18 percent

Content of rock fragments—35 to 60 percent (10 to 40 percent cobbles and stones, 15 to 50 percent pebbles)

Reaction—pH 6.1 to 7.8

## Lumpgulch Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, ridges, and side slopes of hills

*Parent material:* Local colluvium, residuum, and slope alluvium derived from granite

*Slope range:* 4 to 60 percent

*Elevation range:* 4,500 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Typic Haplustalfs

### Typical Pedon

Lumpgulch gravelly sandy clay loam, in an area of Lumpgulch, bouldery-Rock outcrop-Elmark, bouldery, complex, 8 to 35 percent slopes; in a forested area,

675 feet north and 875 feet west of the southeast corner of sec. 17, T. 5 N., R. 2 W.

Oi—1 inch to 0; partially decomposed needles, twigs, and leaves.

A—0 to 2 inches; brown (10YR 4/3) gravelly sandy clay loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine, common fine, and few medium and coarse roots; 15 percent granite pebbles; neutral (pH 7.0); clear smooth boundary.

E—2 to 7 inches; light brownish gray (10YR 6/2) gravelly sandy clay loam, brown (10YR 5/3) moist; weak medium and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, common fine, and few medium and coarse roots; many very fine and few fine pores; 25 percent granite pebbles; neutral (pH 6.6); clear smooth boundary.

Bt—7 to 22 inches; light olive brown (2.5Y 5/4) gravelly sandy clay loam, olive brown (2.5Y 4/4) moist; moderate medium and coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots and few medium and coarse roots; many very fine and few fine pores; many faint clay films bridging sand grains and on faces of peds; 30 percent granite pebbles; neutral (pH 6.8); clear wavy boundary.

Cr—22 to 27 inches; light olive gray (5Y 6/2), decomposed granite bedrock (grus) that crushes to very gravelly loamy coarse sand.

R—27 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to the argillic horizon:* 7 to 16 inches

*Depth to Cr horizon:* 20 to 38 inches

*Depth to R layer:* 23 to 40 inches

*Percent of surface covered by boulders:* 0.01 to 3.0 percent

*A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 3 or 4 moist

Chroma—2 or 3

Texture—sandy clay loam, coarse sandy loam, or loam

Clay content—10 to 25 percent

Content of rock fragments—0 to 25 percent pebbles

Reaction—pH 6.1 to 7.3

*E horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2 or 3

Texture—coarse sandy loam, sandy loam, or sandy clay loam

Clay content—10 to 25 percent

Content of rock fragments—5 to 25 percent pebbles

Reaction—pH 6.1 to 7.3

*Bt horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—3 or 4

Texture—sandy clay loam or clay loam

Clay content—20 to 30 percent

Content of rock fragments—10 to 35 percent pebbles

Reaction—pH 6.1 to 7.3

### Macabre Series

*Depth class:* Moderately deep (20 to 40 inches) to decomposing welded tuff and deep (40 to 60 inches) to hard, fractured welded tuff bedrock

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Side slopes of hills and mountains

*Parent material:* Residuum and slope alluvium derived from welded tuff bedrock

*Slope range:* 8 to 60 percent

*Elevation range:* 4,500 to 6,200 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 95 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Vitrandic Argiustolls

### Typical Pedon

Macabre very cobbly sandy clay loam, in an area of nonstocked forest, 1,300 feet west and 1,800 feet south of the northeast corner of sec. 35, T. 4 N., R. 11 W., Deer Lodge County, Montana:

A—0 to 9 inches; gray (10YR 5/1) very cobbly sandy clay loam, very dark grayish brown (10YR 3/2) moist; moderate very fine and fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; 15 percent cobbles and 25 percent pebbles; slightly alkaline (pH 7.4); clear wavy boundary.

**Bt**—9 to 17 inches; grayish brown (2.5Y 5/2) very cobbly sandy clay loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine, common medium, and few coarse roots; many medium tubular pores; common distinct clay films on faces of peds; 15 percent cobbles and 25 percent pebbles; slightly alkaline (pH 7.6); gradual wavy boundary.

**BC**—17 to 27 inches; light brownish gray (2.5Y 6/2) very cobbly sandy clay loam, light olive brown (2.5Y 5/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium and coarse roots; common medium tubular pores; 20 percent cobbles and 25 percent pebbles; slightly alkaline (pH 7.8); gradual irregular boundary.

**Cr**—27 to 41 inches; light gray (N 7/), decomposing welded tuff bedrock.

**R**—41 inches; light gray (5Y 7/1), fractured, hard welded tuff bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Content of volcanic glass:* More than 30 percent in the coarse silt and sand fraction of one or more horizons

*Thickness of the mollic epipedon:* 7 to 10 inches

*Depth to argillic horizon:* 6 to 12 inches

*Depth to Cr horizon:* 20 to 40 inches

*Depth to R layer:* 40 to 60 inches

*Percent of surface covered by stones or boulders:* 0 to 3 percent

#### *A horizon:*

Hue—10YR or 2.5Y

Value—3, 4, or 5 dry; 2 or 3 moist

Chroma—1 or 2

Texture—loam or sandy clay loam

Clay content—18 to 27 percent

Content of rock fragments—15 to 45 percent (5 to 15 percent cobbles and stones, 10 to 30 percent pebbles)

Reaction—pH 6.1 to 7.8

#### *Bt horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2 or 3

Texture—loam, clay loam, or sandy clay loam

Clay content—23 to 30 percent

Content of rock fragments—35 to 60 percent (5 to 25 percent cobbles and stones, 25 to 35 percent pebbles)

Reaction—pH 6.1 to 7.8

#### *BC horizon:*

Hue—10YR, 2.5Y, or 5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—1, 2, 3, or 4

Texture—loam, sandy loam, or sandy clay loam

Clay content—15 to 25 percent

Content of rock fragments—35 to 60 percent (10 to 25 percent cobbles and stones, 25 to 35 percent pebbles)

Reaction—pH 6.1 to 7.8

## Maiden Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, divides, ridges, and side slopes of hills

*Parent material:* Local colluvium, residuum, and slope alluvium derived from limestone

*Slope range:* 4 to 60 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 38 to 42 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, carbonatic, frigid Typic Calciustolls

### Typical Pedon

Maiden very gravelly loam, in an area of Maiden-Lap-Windham complex, 15 to 35 percent slopes, in rangeland, 900 feet south and 650 feet east of the northwest corner of sec. 1, T. 1 N., R. 2 W.

**A**—0 to 4 inches; dark grayish brown (10YR 4/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular structure; slightly hard, very friable, nonsticky and nonplastic; many fine and very fine roots; 5 percent cobbles and 35 percent pebbles; disseminated lime, few faint coatings of lime on undersides of fragments; strongly effervescent; slightly alkaline (pH 7.8); abrupt wavy boundary.

**Ak**—4 to 7 inches; grayish brown (10YR 5/2) very gravelly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; many

very fine and fine pores; 15 percent cobbles and 40 percent pebbles; disseminated lime, common fine threads and masses of light gray (10YR 7/2) lime, few faint lime coatings on fragments; violently effervescent; moderately alkaline (pH 8.2); clear wavy boundary.

Bk1—7 to 18 inches; light gray (10YR 7/2) very cobbly loam, light brownish gray (10YR 6/2) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; many fine and very fine roots; common fine and many very fine pores; 25 percent cobbles and 30 percent pebbles; disseminated lime, many medium masses and threads of white (10YR 8/2) lime, common distinct lime casts on fragments; violently effervescent; moderately alkaline (pH 8.4); gradual wavy boundary.

Bk2—18 to 26 inches; light brownish gray (10YR 6/2) very cobbly loam, grayish brown (10YR 5/2) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; few very fine roots; few or common very fine pores; 20 percent cobbles and 40 percent pebbles; disseminated lime, many medium masses and threads of white (10YR 8/2) lime, many prominent lime casts on surface of fragments; violently effervescent; strongly alkaline (pH 8.6); abrupt smooth boundary.

R—26 inches; light gray (10YR 7/2), hard limestone.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 8 inches

*Depth to Bk horizon:* 5 to 8 inches

*Depth to bedrock:* 20 to 40 inches

*Percent of surface covered by stones or boulders:* 0 to 3 percent

#### A horizon:

Hue—10YR or 2.5Y

Value—4 or 5 dry

Chroma—2 or 3

Clay content—15 to 27 percent

Content of rock fragments—15 to 45 percent (0 to 15 percent cobbles and stones, 15 to 40 percent pebbles)

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.4 to 8.4

#### Bk horizon:

Hue—10YR or 2.5Y

Value—5, 6, 7, or 8 dry; 5, 6, or 7 moist

Chroma—2 or 3

Clay content—10 to 25 percent

Content of rock fragments—35 to 70 percent (5 to 25 percent cobbles and stones, 30 to 50 percent pebbles)

Calcium carbonate equivalent—40 to 60 percent (including rock fragments less than 20 mm in size)

Reaction—pH 7.9 to 9.0

### Marcel Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Somewhat poorly drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans; side slopes of mountains

*Parent material:* Alpine glacial till or slope alluvium derived from hard, fine grained igneous or metamorphic rocks

*Slope range:* 2 to 25 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Oxyaquic Argicryolls

### Typical Pedon

Marcel gravelly loam, in an area of Sebud-Marcel complex, 4 to 25 percent slopes, bouldery, in rangeland, 850 feet south and 2,350 feet east of the northwest corner of sec. 31, T. 4 N., R. 3 W.

Oe—2 inches to 0; decomposed leaves and roots.

A1—0 to 2 inches; very dark grayish brown (10YR 3/2) gravelly loam, black (10YR 2/1) moist; moderate very fine and fine granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine pores; 5 percent rounded cobbles and 20 percent rounded pebbles; slightly acid (pH 6.2); clear wavy boundary.

A2—2 to 9 inches; very dark gray (10YR 3/1) gravelly loam, black (10YR 2/1) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine and fine pores; 5 percent rounded cobbles and 20 percent rounded pebbles; slightly acid (pH 6.2); gradual wavy boundary.

A3—9 to 18 inches; very dark grayish brown (10YR 3/2) very gravelly loam, black (10YR 2/1) moist; moderate medium subangular blocky structure;

slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine and fine pores; 10 percent rounded cobbles and 25 percent rounded pebbles; slightly acid (pH 6.2); gradual wavy boundary.

**Bt1**—18 to 24 inches; brown (10YR 4/3) very gravelly sandy clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, firm, moderately sticky and moderately plastic; many very fine and fine roots; many very fine and fine pores; few faint clay films on faces of peds; 5 percent rounded cobbles and 40 percent rounded pebbles; slightly acid (pH 6.4); gradual irregular boundary.

**Bt2**—24 to 42 inches; yellowish brown (10YR 5/4) very gravelly sandy clay loam, dark brown (7.5YR 4/4) moist; few faint strong brown (7.5YR 5/6) redox concentrations; moderate medium subangular blocky structure; hard, firm, moderately sticky and moderately plastic; common very fine and fine roots; many very fine and fine pores; common faint clay films on faces of peds; 10 percent cobbles and 35 percent pebbles; neutral (pH 6.6); gradual irregular boundary.

**Bt3**—42 to 60 inches; yellowish brown (10YR 5/4) very gravelly clay loam, dark brown (7.5YR 4/4) moist; common distinct strong brown (7.5YR 5/6) iron concentrations; moderate coarse prismatic structure; hard, firm, moderately sticky and moderately plastic; few very fine and fine roots; common very fine pores; few faint clay films on faces of peds; 10 percent rounded cobbles and 35 percent rounded pebbles; neutral (pH 6.6).

### Range in Characteristics

*Soil temperature:* 36 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 16 to 26 inches

*Depth to Bt horizon:* 14 to 26 inches

*Depth to seasonal high water table:* 24 to 42 inches from May through July

*Percent of surface covered by stones or boulders:* 0.01 to 3.0 percent

#### *A horizon:*

Hue—10YR or 2.5Y

Value—3 or 4 dry; 2 or 3 moist

Chroma—1 or 2

Texture—loam or silt loam

Clay content—15 to 27 percent

Content of rock fragments—15 to 40 percent (0 to 15 percent cobbles and stones, 15 to 25 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *Bt1 horizon:*

Hue—7.5YR or 10YR

Value—4 or 5 dry; 3 or 4 moist

Chroma—3 or 4

Texture—sandy clay loam or clay loam

Clay content—20 to 30 percent

Content of rock fragments—35 to 60 percent (5 to 20 percent stones and cobbles, 30 to 40 percent pebbles)

Reaction—pH 5.6 to 7.3

#### *Bt2 and Bt3 horizons:*

Hue—7.5YR or 10YR

Value—4 or 5 dry; 3 or 4 moist

Chroma—3 or 4

Texture—sandy clay loam or clay loam

Clay content—22 to 35 percent

Content of rock fragments—35 to 60 percent (5 to 25 percent stones and cobbles, 30 to 40 percent pebbles)

Reaction—pH 5.6 to 7.3

## Martinsdale Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderately slow (0.2 to 0.6 inch per hour)

*Landform:* Alluvial fans, remnant stream terraces, and side slopes of hills

*Parent material:* Alluvium derived from mixed rock sources

*Slope range:* 1 to 35 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Typic Argiustolls

### Typical Pedon

Martinsdale loam, in an area of Martinsdale, stony-Martinsdale-Hilger complex, 2 to 8 percent slopes, in rangeland, 400 feet west and 1,100 feet south of the northeast corner of sec. 20, T. 4 N., R. 4 W.

**A**—0 to 6 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; 5 percent rounded pebbles; slightly alkaline (pH 7.4); clear smooth boundary.

**Bt1**—6 to 9 inches; brown (10YR 5/3) gravelly clay loam, dark brown (10YR 3/3) moist; moderate

medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine pores; common distinct clay films on faces of peds and bridging sand grains; 5 percent rounded cobbles and 15 percent rounded pebbles; slightly alkaline (pH 7.6); clear smooth boundary.

**Bt2**—9 to 11 inches; pale brown (10YR 6/3) gravelly clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; hard, friable, moderately sticky and moderately plastic; common fine and very fine roots; many distinct dark brown (10YR 3/3) clay films on faces of peds and bridging sand grains; 5 percent rounded cobbles and 15 percent rounded pebbles; slightly alkaline (pH 7.6); clear wavy boundary.

**Bk1**—11 to 33 inches; very pale brown (10YR 7/3) gravelly loam, yellowish brown (10YR 5/4) moist; moderate coarse prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and medium roots; common very fine pores; 5 percent rounded cobbles and 20 percent rounded pebbles; disseminated lime, common fine and medium threads and masses of lime, common faint lime coatings on undersides of fragments; violently effervescent; moderately alkaline (pH 8.0); gradual wavy boundary.

**Bk2**—33 to 60 inches; very pale brown (10YR 7/3) very gravelly loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; common fine and very fine roots in the upper part and few roots in the lower part; 5 percent rounded cobbles and 30 percent rounded pebbles; disseminated lime, common medium masses and threads of lime, common distinct lime coatings on fragments; violently effervescent; moderately alkaline (pH 8.3).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 12 inches

*Depth to Bt horizon:* 6 to 12 inches

*Depth to Bk horizon:* 11 to 30 inches

*Percent of surface covered by stones or boulders:* 0 to 3 percent

*A horizon:*

Value—4 or 5 dry; 2 or 3 moist

Chroma—2 or 3

Texture—loam, sandy clay loam, or clay loam

Clay content—18 to 35 percent

Content of rock fragments—0 to 25 percent (0 to 10 percent cobbles, 0 to 15 percent pebbles)

Reaction—pH 6.6 to 7.8

*Bt horizon:*

Hue—2.5Y or 10YR

Value—4, 5, or 6 dry; 2, 3, or 4 moist

Chroma—2, 3, or 4

Texture—sandy clay loam, loam, or clay loam

Clay content—25 to 35 percent

Content of rock fragments—0 to 15 percent (0 to 5 percent cobbles, 0 to 15 percent pebbles)

Reaction—pH 6.6 to 8.4

*Bk horizon:*

Hue—10YR or 2.5Y

Value—6, 7, or 8 dry; 4, 5, 6, or 7 moist

Chroma—2, 3, or 4

Texture—loam, clay loam, sandy clay loam, or sandy loam

Clay content—15 to 35 percent

Calcium carbonate equivalent—15 to 35 percent

Content of rock fragments—0 to 35 percent (0 to 5 percent cobbles, 0 to 30 percent pebbles)

Reaction—pH 7.4 to 8.4

### Mckenton Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Very poorly drained

*Permeability:* Slow (0.06 to 0.2 inch per hour)

*Landform:* Flood plains, flood-plain steps, and drainageways

*Parent material:* Saline and sodic, recent alluvium derived from mixed rock sources

*Slope range:* 0 to 2 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine, mixed, superactive, calcareous, frigid Fluvaquentic Endoaquolls

### Typical Pedon

Mckenton clay loam, in an area of Ledger-Moltoner-Mckenton complex, 0 to 2 percent slopes, in pasture, 1,800 feet north and 2,400 feet west of the southeast corner of sec. 13, T. 4 N., R. 3 W.

**Ag1**—0 to 2 inches; very dark grayish brown (2.5Y 3/2) clay loam, dark grayish brown (2.5Y 4/2) dry; many distinct very dark gray (5Y 3/1) redox depletions; moderate medium subangular blocky structure; slightly hard, very friable, moderately sticky and moderately plastic; many very fine and fine roots; many very fine and fine pores; 5 percent rounded pebbles; disseminated lime;

- strongly effervescent; very strongly alkaline (pH 9.6); clear wavy boundary.
- Ag2—2 to 6 inches; very dark grayish brown (2.5Y 3/2) clay loam, dark grayish brown (2.5Y 4/2) dry; many distinct very dark gray (N 3/) redox depletions; strong medium prismatic structure parting to moderate medium subangular blocky; hard, very firm, very sticky and very plastic; many very fine and fine roots; many very fine and fine pores; 5 percent rounded pebbles; strongly effervescent; very strongly alkaline (pH 9.6); clear wavy boundary.
- Bg—6 to 11 inches; very dark grayish brown (2.5Y 3/2) clay loam, grayish brown (2.5Y 5/2) dry; many prominent black (N 2.5/) redox depletions; strong coarse prismatic structure; very hard, very firm, very sticky and very plastic; common very fine and fine roots; common very fine and fine pores; 5 percent rounded pebbles; slightly effervescent; very strongly alkaline (pH 9.2); gradual wavy boundary.
- 2Bkzg1—11 to 17 inches; dark grayish brown (2.5Y 4/2) gravelly clay loam, light brownish gray (2.5Y 6/2) dry; many distinct very dark gray (5Y 3/1) redox depletions and few distinct strong brown (7.5YR 5/6) redox concentrations; strong coarse and very coarse prismatic structure; very hard, firm, moderately sticky and moderately plastic; common very fine and fine roots; common very fine and fine pores; 15 percent pebbles; disseminated lime, common medium masses and threads of lime, common distinct lime coatings on undersides of pebbles; common medium masses and threads of soluble salt; violently effervescent; moderately alkaline (pH 8.2); gradual irregular boundary.
- 2Bkzg2—17 to 28 inches; greenish gray (5GY 5/1) and dark gray (5Y 4/1) gravelly clay loam, olive (5Y 5/3) dry; common distinct very dark gray (5Y 3/1) redox depletions and common distinct strong brown (7.5YR 5/6) redox concentrations; massive; hard, firm, moderately sticky and moderately plastic; few very fine roots; common very fine and fine pores; 20 percent rounded pebbles; disseminated lime, few fine masses and threads of lime, few faint lime coatings on pebbles; few fine masses and threads of salt; strongly effervescent; moderately alkaline (pH 8.2); gradual irregular boundary.
- 2Bkzg3—28 to 45 inches; dark gray (5Y 4/1) and greenish gray (5GY 5/1) gravelly clay loam with thin strata of clay and loam, olive (5Y 5/4) dry; common distinct very dark gray (5Y 3/1) redox depletions; massive; hard, friable, slightly sticky and moderately plastic; few very fine roots; few very fine pores; 30 percent rounded pebbles; disseminated lime, few fine threads of lime; few fine masses and threads of soluble salt; slightly effervescent; moderately alkaline (pH 8.2); gradual wavy boundary.
- 2Cg—45 to 60 inches; olive (5Y 4/3) and greenish gray (5GY 5/1), stratified gravelly clay loam and clay, pale olive (5Y 6/3) and greenish gray (5GY 5/1) dry; common distinct very dark gray (5Y 3/1) redox depletions; massive; hard, friable, slightly sticky and moderately plastic; few very fine roots; few very fine pores; 30 percent pebbles; disseminated lime; slightly effervescent; moderately alkaline (pH 8.2).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F  
*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 11 inches

*Depth to Bk horizon:* 11 to 15 inches

*Water table:* At the surface to 12 inches below the surface for extended periods during spring and summer

#### Ag horizon:

Hue—10YR, 2.5Y, or 5Y

Value—3, 4, or 5 dry; 2 or 3 moist

Chroma—1 or 2

Texture—silty clay loam, clay loam, or silt loam

Clay content—22 to 40 percent

Content of rock fragments—0 to 5 percent pebbles

Electrical conductivity—8 to 20 mmhos/cm

Sodium adsorption ratio—4 to 16

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 7.9 to 9.6

#### Bg horizon:

Hue—2.5Y or 5Y

Value—4 or 5 dry; 2 or 3 moist

Chroma—1 or 2

Texture—clay loam, silty clay loam, or clay

Clay content—35 to 45 percent

Content of rock fragments—0 to 10 percent pebbles

Electrical conductivity—4 to 16 mmhos/cm

Sodium adsorption ratio—4 to 16

Calcium carbonate equivalent—0 to 10 percent

Reaction—pH 7.9 to 9.6

#### 2Bkzg horizon:

Hue—2.5Y, 5Y, or 5GY

Value—4, 5, or 6 dry; 4 or 5 moist

Chroma—1, 2, 3, or 4

Texture—clay loam, clay, or silty clay loam  
 Clay content—35 to 45 percent  
 Content of rock fragments—5 to 35 percent pebbles  
 Electrical conductivity—2 to 16 mmhos/cm  
 Sodium adsorption ratio—2 to 13  
 Calcium carbonate equivalent—5 to 15 percent  
 Reaction—pH 7.9 to 9.6

*2Cg horizon:*

Hue—5Y, 5GY, or 2.5Y  
 Value—5, 6, or 7 dry; 3, 4, or 5 moist  
 Chroma—1, 2, or 3  
 Texture—clay loam or silty clay loam  
 Clay content—35 to 40 percent  
 Content of rock fragments—15 to 45 percent pebbles  
 Electrical conductivity—2 to 16 mmhos/cm  
 Sodium adsorption ratio—2 to 13  
 Calcium carbonate equivalent—5 to 15 percent  
 Reaction—pH 7.9 to 9.6

## Meadowcreek Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Somewhat poorly drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour) above the 2C horizon and rapid (6.0 to 20 inches per hour) in the 2C horizon

*Landform:* Drainageways, flood plains, flood-plain steps, and terraces

*Parent material:* Recent alluvium derived from mixed rock sources

*Slope range:* 0 to 2 percent

*Elevation range:* 3,600 to 5,500 feet

*Annual precipitation:* 10 to 19 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 80 to 115 days

**Taxonomic classification:** Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Fluvaquentic Haplustolls

### Typical Pedon

Meadowcreek loam, in an area of Fairway-Meadowcreek complex, 0 to 2 percent slopes, in pasture, 2,700 feet south and 2,180 feet west of the northeast corner of sec. 4, T. 1 N., R. 3 W.

Ap—0 to 6 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; soft, friable, moderately sticky and slightly plastic; many very fine roots; slightly effervescent; moderately alkaline (pH 8.0); clear smooth boundary.

A—6 to 14 inches; grayish brown (2.5Y 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic structure parting to weak fine and medium subangular blocky; slightly hard, friable, moderately sticky and slightly plastic; common very fine roots; many fine pores; strongly effervescent; moderately alkaline (pH 8.2); clear smooth boundary.

Bg—14 to 27 inches; light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (10YR 4/2) moist; common faint brown (7.5YR 5/4) redox concentrations; weak medium and coarse prismatic structure; slightly hard, friable, moderately sticky and slightly plastic; common very fine roots; many very fine pores; slightly alkaline (pH 7.6); clear smooth boundary.

2C—27 to 60 inches; light brownish gray (10YR 6/2) very gravelly loamy sand, dark grayish brown (10YR 4/2) moist; common faint brown (7.5YR 5/4) redox concentrations; single grain; loose, nonsticky and nonplastic; few very fine roots; 5 percent rounded cobbles and 55 percent rounded pebbles; neutral (pH 7.2).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 10 to 15 inches

*Depth to 2C horizon:* 20 to 40 inches

*Depth to seasonal high water table:* 24 to 42 inches

*A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 2 or 3 moist

Chroma—1 or 2

Texture—loam or silty clay loam

Clay content—18 to 35 percent

Content of rock fragments—0 to 5 percent pebbles

Calcium carbonate equivalent—0 to 10 percent

Reaction—pH 7.4 to 8.4

*Bg horizon:*

Hue—10YR, 2.5Y, or 5Y

Value—5 or 6 dry; 3 or 4 moist

Chroma—1, 2, or 3

Texture—loam, sandy loam, or silt loam

Clay content—18 to 25 percent

Content of rock fragments—0 to 5 percent pebbles

Reaction—pH 6.6 to 7.8

*2C horizon:*

Texture—sand or loamy sand

Clay content—0 to 10 percent

Content of rock fragments—50 to 75 percent (0 to

15 percent cobbles and stones, 50 to 70 percent pebbles)  
Reaction—pH 6.1 to 7.3

## Mocmont Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, escarpments, ridges, and side slopes of mountains

*Parent material:* Colluvium or slope alluvium derived from argillite, fine grained igneous rock, or sandstone

*Slope range:* 25 to 60 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Haplustalfs

### Typical Pedon

Mocmont very cobbly loam, in an area of Mocmont, bouldery-Roegulch, rubbly-Rock outcrop complex, 25 to 60 percent slopes; in a forested area, 1,250 feet east and 1,475 feet south of the northwest corner of sec. 6, T. 4 N., R. 3 W.

Oi— $\frac{1}{2}$  inch to 0; forest litter of undecomposed and partially decomposed needles, twigs, cones, and leaves.

A—0 to 1 inch; dark gray (10YR 4/1) very cobbly loam, black (10YR 2/1) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine roots; 15 percent cobbles and 25 percent pebbles; slightly alkaline (pH 7.4); clear smooth boundary.

Bt/E—1 to 9 inches; 60 percent light olive brown (2.5Y 5/4) very cobbly clay loam, brown (10YR 4/3) moist (Bt part); 40 percent light gray (10YR 6/1) very gravelly loam, dark gray (10YR 4/1) moist (E part); strong medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; many medium, fine, and very fine roots and common coarse roots; many fine and very fine pores; 10 percent angular cobbles and 35 percent angular pebbles; neutral (pH 7.0); gradual wavy boundary.

Bt1—9 to 21 inches; light olive brown (2.5Y 5/4) very cobbly clay loam, olive brown (2.5Y 4/4) moist; strong medium subangular blocky structure; slightly hard, firm, moderately sticky and moderately plastic; many very fine and fine roots

and few medium and coarse roots; many very fine and fine pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds and bridging sand grains; 20 percent angular cobbles and 25 percent angular pebbles; neutral (pH 7.2); gradual wavy boundary.

Bt2—21 to 37 inches; light olive brown (2.5Y 5/4) very gravelly sandy clay loam, olive brown (2.5Y 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; common very fine and fine roots and few coarse roots; many very fine and fine pores; few faint clay films on faces of peds and bridging sand grains; 15 percent angular cobbles and 35 percent angular pebbles; neutral (pH 7.2); gradual wavy boundary.

BC—37 to 50 inches; light yellowish brown (10YR 6/4) extremely gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine pores; 15 percent angular cobbles and 50 percent angular pebbles; slightly alkaline (pH 7.6); clear wavy boundary.

C—50 to 60 inches; yellowish brown (10YR 5/4) extremely gravelly loamy coarse sand, dark yellowish brown (10YR 4/4) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; 15 percent angular cobbles and 60 percent angular pebbles; slightly alkaline (pH 7.6).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Percent of surface covered by stones or boulders:* 0.01 to 3.0 percent

*A horizon:*

Value—4, 5, or 6 dry; 2, 3, or 4 moist

Chroma—1 or 2

Clay content—15 to 27 percent

Content of rock fragments—15 to 60 percent (10 to 25 percent cobbles, 5 to 35 percent pebbles)

Reaction—pH 6.1 to 7.8

*Bt/E horizon:*

Hue—2.5Y or 10YR

Value—6 or 7 dry, 4 or 5 moist (E part); 5 or 6 dry, 4 or 5 moist (Bt part)

Chroma—1, 2, 3, or 4

Texture (mixed)—loam or clay loam

Clay content—10 to 20 percent (E part); 25 to 35 percent (Bt part)

Content of rock fragments—35 to 60 percent (10

to 30 percent cobbles, 25 to 55 percent pebbles)

Reaction—pH 6.1 to 7.3

*Bt horizon:*

Hue—2.5Y or 10YR

Value—5 or 6 dry; 4 or 5 moist

Chroma—3, 4, or 6

Texture—loam, clay loam, or sandy clay loam

Clay content—20 to 35 percent

Content of rock fragments—35 to 85 percent (10 to 30 percent cobbles, 25 to 55 percent pebbles)

Reaction—pH 6.1 to 7.3

*BC horizon:*

Hue—2.5Y or 10YR

Value—5 or 6 dry; 4 or 5 moist

Chroma—3, 4, or 6

Texture—sandy clay loam, loam, or sandy loam

Clay content—10 to 25 percent

Content of rock fragments—60 to 90 percent (15 to 40 percent cobbles and stones, 35 to 50 percent pebbles)

Reaction—pH 6.1 to 7.8

*C horizon:*

Hue—2.5Y or 10YR

Value—5 or 6 dry; 4 or 5 moist

Chroma—3, 4, or 6

Texture—loamy coarse sand or loamy sand

Clay content—10 to 15 percent

Content of rock fragments—60 to 90 percent (15 to 40 percent cobbles and stones, 35 to 60 percent pebbles)

Reaction—pH 6.1 to 7.8

## Moltoner Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Poorly drained

*Permeability:* Moderately slow (0.2 to 0.6 inch per hour)

*Landform:* Flood plains, flood-plain steps, and drainageways

*Parent material:* Saline and sodic alluvium derived from mixed rock sources

*Slope range:* 0 to 2 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, calcareous, frigid Aeric Fluvaquents

## Typical Pedon

Moltoner silt loam, in an area of Ledger-Moltoner-Mckenton complex, 0 to 2 percent slopes, in pasture, 1,700 feet north and 1,900 feet west of the southeast corner of sec. 23, T. 2 N., R. 1 W.

Az—0 to 5 inches; dark brown (10YR 3/3) silt loam, dark grayish brown (10YR 4/2) dry; moderate very fine and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine pores; disseminated lime; few very fine masses of soluble salt; slightly effervescent; moderately alkaline (pH 8.2); clear wavy boundary.

Cz1—5 to 20 inches; dark grayish brown (10YR 4/2) silt loam with thin strata of fine and medium sand, grayish brown (10YR 5/2) dry; few faint strong brown (7.5YR 5/6) redox concentrations; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine roots; many very fine pores; disseminated lime; few very fine masses of soluble salt; slightly effervescent; moderately alkaline (pH 8.2); clear wavy boundary.

Cz2—20 to 27 inches; dark grayish brown (2.5Y 4/2) silt loam, grayish brown (10YR 5/2) dry; common faint strong brown (7.5YR 5/6) redox concentrations; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine pores; disseminated lime; few very fine masses and threads of soluble salt; slightly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary.

Czg1—27 to 35 inches; grayish brown (2.5Y 5/2) coarse sandy loam consisting of thin layers of loam, silt loam, and coarse sand, light brownish gray (10YR 6/2) dry; common faint very dark gray (5Y 3/1) redox depletions; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common very fine pores; disseminated lime; few very fine masses and threads of soluble salt; slightly effervescent; moderately alkaline (pH 8.0); abrupt wavy boundary.

Czg2—35 to 49 inches; grayish brown (2.5Y 5/2) loam consisting of thin layers of silt and fine sand, light brownish gray (10YR 6/2) dry; common distinct strong brown (7.5YR 5/6) redox concentrations and common faint dark gray (5Y 4/1) redox depletions; massive; hard, firm, slightly sticky and slightly plastic; few very fine roots; few very fine pores; disseminated lime; few very fine threads of

soluble salt; slightly effervescent; moderately alkaline (pH 8.3); clear wavy boundary.

Cg—49 to 60 inches; grayish brown (2.5Y 5/2) loam consisting of thin layers of loam, clay, and silt loam, light brownish gray (10YR 6/2) dry; many distinct strong brown (7.5YR 5/6) redox concentrations and many distinct dark gray (5Y 4/1) redox depletions; massive; hard, firm, slightly sticky and slightly plastic; few very fine pores; disseminated lime; slightly effervescent; moderately alkaline (pH 8.2).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to the water table:* 6 to 24 inches during early spring runoff and during irrigation

*Az horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 2, 3, 4, or 5 moist

Chroma—1, 2, or 3

Texture—loam, silt loam, or silty clay loam

Clay content—15 to 30 percent

Content of rock fragments—0 to 15 percent pebbles

Electrical conductivity—8 to 16 mmhos/cm

Sodium adsorption ratio—13 to 30

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 7.9 to 9.6

*Cz and Czg horizons:*

Hue—10YR, 2.5Y, or 5Y

Value—4, 5, 6, or 7 dry; 3, 4, or 5 moist

Chroma—1 or 2

Texture—loam, clay loam, coarse sandy loam, or silt loam consisting of thin layers of silt, clay, loamy fine sand, fine sand or coarse sand, and sand and gravel

Clay content—18 to 35 percent

Content of rock fragments—0 to 20 percent pebbles

Electrical conductivity—8 to 16 mmhos/cm

Sodium adsorption ratio—13 to 30

Calcium carbonate equivalent—10 to 20 percent

Reaction—pH 7.9 to 9.6

*Cg horizon:*

Hue—10YR, 2.5Y, or 5Y

Value—5, 6, or 7 dry; 3, 4, 5, or 6 moist

Chroma—1 or 2

Texture—loam, clay loam, or silt loam consisting of thin layers of loamy fine sand, fine sand or sand and gravel, silt, and clay

Clay content (weighted average)—18 to 35 percent

Content of rock fragments—0 to 20 percent pebbles

Electrical conductivity—8 to 16 mmhos/cm

Sodium adsorption ratio—4 to 20

Calcium carbonate equivalent—10 to 20 percent

Reaction—pH 7.9 to 9.0

## Monaberg Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderately slow (0.2 to 0.6 inch per hour)

*Landform:* Alluvial fans and side slopes of mountains

*Parent material:* Slope alluvium and alpine glacial till derived from hard, fine grained igneous and metamorphic rocks

*Slope range:* 2 to 35 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Fine-loamy, mixed, superactive Ustic Argicryolls

### Typical Pedon

Monaberg gravelly loam, in an area of Libeg-Monaberg gravelly loams, 2 to 15 percent slopes, bouldery, in rangeland, 20 feet east and 2,640 feet south of the northwest corner of sec. 1, T. 4 N., R. 4 W.

A1—0 to 3 inches; very dark grayish brown (10YR 3/2) gravelly loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine roots; 20 percent rounded pebbles; neutral (pH 6.6); clear wavy boundary.

A2—3 to 11 inches; very dark grayish brown (10YR 3/2) gravelly loam, black (10YR 2/1) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine and fine pores; 20 percent rounded pebbles; neutral (pH 6.8); clear wavy boundary.

Bt1—11 to 17 inches; light olive brown (2.5Y 5/4) gravelly clay loam, dark yellowish brown (10YR 3/4) moist; moderate medium prismatic structure parting to strong medium subangular blocky; slightly hard, firm, moderately sticky and moderately plastic; many very fine and fine roots; many very fine pores; common distinct clay films

on faces of peds; 20 percent pebbles; neutral (pH 7.2); clear wavy boundary.

- Bt2—17 to 27 inches; light olive brown (2.5Y 5/4) gravelly clay loam, olive brown (2.5Y 4/4) moist; moderate medium prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium roots; many very fine pores; common faint clay films on faces of peds; 15 percent rounded pebbles; slightly alkaline (pH 7.4); gradual wavy boundary.
- Bt3—27 to 48 inches; light olive brown (2.5Y 5/4) gravelly clay loam, olive brown (2.5Y 4/4) moist; weak medium and coarse prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots and few medium roots; common medium pores; few faint clay films on faces of peds; 25 percent rounded pebbles; slightly alkaline (pH 7.4); gradual irregular boundary.
- BC—48 to 60 inches; light yellowish brown (2.5Y 6/4) gravelly loam, olive brown (2.5Y 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine and fine pores; 30 percent rounded pebbles; slightly alkaline (pH 7.4).

### Range in Characteristics

*Soil temperature:* 36 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 10 to 16 inches

*Percent of surface covered by stones or boulders:* 0 to 0.1 percent

#### *A horizon:*

Value—3 or 4 dry; 2 or 3 moist

Chroma—1 or 2

Clay content—18 to 27 percent

Content of rock fragments—5 to 25 percent (0 to 5 percent cobbles, 5 to 20 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *Bt horizon:*

Hue—2.5Y or 10YR

Value—4 or 5 dry; 3 or 4 moist

Chroma—3 or 4

Texture—loam, clay loam, or sandy clay loam

Clay content—25 to 35 percent

Content of rock fragments—10 to 35 percent (0 to 5 percent cobbles, 10 to 30 percent pebbles)

Reaction—pH 6.1 to 7.8

#### *BC horizon:*

Hue—2.5Y, 10YR, or 7.5YR

Value—5 or 6 dry; 4 or 5 moist

Chroma—3 or 4

Texture—loam, clay loam, or sandy clay loam

Clay content—15 to 30 percent

Content of rock fragments—15 to 35 percent (0 to 5 percent cobbles, 15 to 30 percent pebbles)

Reaction—pH 6.1 to 7.8

### Mooseflat Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Very poorly drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Flood plains, flood-plain steps, and drainageways

*Parent material:* Recent alluvium derived from mixed rock sources

*Slope range:* 1 to 8 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Fine-loamy over sandy or sandy-skeletal, mixed, superactive Typic Cryaquolls

### Typical Pedon

Mooseflat loam, 1 to 4 percent slopes, in pasture, 1,600 feet east and 1,700 feet south of the northwest corner of sec. 22, T. 6 N., R. 6 W.

Oe—0 to 2 inches; black (10YR 2/1) mucky peat, very dark grayish brown (10YR 3/2) dry; neutral (pH 6.8); clear smooth boundary.

A—2 to 10 inches; black (10YR 2/1) loam, gray (10YR 5/1) dry; many fine distinct yellowish brown (10YR 5/6) redox concentrations; moderate medium granular structure; slightly hard, friable, slightly sticky and moderately plastic; many very fine and fine roots; neutral (pH 7.2); clear smooth boundary.

Bg—10 to 18 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; common fine distinct dark yellowish brown (10YR 4/6) redox concentrations; weak thin platy structure; hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; common very fine pores; neutral (pH 6.8); abrupt smooth boundary.

BCg—18 to 22 inches; dark gray (10YR 4/1) loamy fine sand, light gray (10YR 7/1) dry; common fine distinct yellowish brown (10YR 5/4) redox concentrations; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few fine roots; common very fine pores;

5 percent rounded pebbles; neutral (pH 6.8); abrupt smooth boundary.

2Cg—22 to 60 inches; gray (10YR 5/1) very cobbly loamy sand, light gray (10YR 6/1) dry; single grain; loose, nonsticky and nonplastic; 35 percent rounded cobbles and 25 percent rounded pebbles; neutral (pH 7.2).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 10 to 19 inches

*Depth to 2Cg horizon:* 14 to 26 inches

*Seasonal high water table:* At the surface to 12 inches below the surface from April through June

#### A horizon:

Hue—10YR, 2.5Y, or 5Y

Value—4 or 5 dry; 2 or 3 moist

Chroma—1 or 2

Clay content—15 to 27 percent

Content of rock fragments—0 to 10 percent cobbles and pebbles

Reaction—pH 5.6 to 7.3

#### Bg horizon:

Hue—10YR, 2.5Y, or 5Y

Value—4, 5, or 6 dry; 2, 3, 4, or 5 moist

Chroma—1 or 2

Texture—loam or silt loam

Clay content—18 to 27 percent

Content of rock fragments—0 to 10 percent cobbles and pebbles

Reaction—pH 6.1 to 7.3

#### BCg horizon:

Hue—10YR, 2.5Y, or 5Y

Value—6 or 7 dry; 4 or 5 moist

Chroma—1 or 2

Texture—fine sandy loam or loamy fine sand

Clay content—10 to 18 percent

Content of rock fragments—5 to 20 percent (0 to 5 percent cobbles, 5 to 15 percent pebbles)

Reaction—pH 6.1 to 7.3

#### 2Cg horizon:

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry

Texture—sand, loamy sand, coarse sand, or loamy coarse sand

Clay content—2 to 12 percent

Content of rock fragments—35 to 70 percent (15 to 50 percent stones and cobbles, 20 to 35 percent pebbles)

Reaction—pH 5.6 to 7.3

## Musselshell Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, plains, and side slopes of hills

*Parent material:* Alluvium derived from limestone

*Slope range:* 1 to 15 percent

*Elevation range:* 3,800 to 5,500 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Coarse-loamy, carbonatic, frigid Aridic Calcustepts

### Typical Pedon

Musselshell cobbly loam, in an area of Musselshell-Crago cobbly loams, 1 to 4 percent slopes, in rangeland, 60 feet west and 1,600 feet south of the northeast corner of sec. 22, T. 5 N., R. 3 W.

A—0 to 2 inches; dark grayish brown (10YR 4/2) cobbly loam, dark brown (10YR 3/3) moist; moderate medium and fine granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine roots; 10 percent rounded cobbles and 15 percent rounded pebbles; disseminated lime, common faint lime coatings on undersides of fragments; slightly effervescent; moderately alkaline (pH 7.9); clear smooth boundary.

Bk1—2 to 6 inches; grayish brown (10YR 5/2) cobbly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine pores; 10 percent rounded cobbles and 15 percent rounded pebbles; disseminated lime, common fine and medium threads and masses of lime, common distinct lime coatings on undersides of fragments; strongly effervescent; moderately alkaline (pH 8.3); clear wavy boundary.

Bk2—6 to 11 inches; light gray (10YR 7/2) gravelly loam, light brownish gray (10YR 6/2) moist; moderate medium prismatic structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine pores; 5 percent rounded cobbles and 15 percent rounded pebbles; disseminated lime, many fine and medium threads and masses of lime, common distinct lime coatings on fragments; violently effervescent; moderately alkaline (pH 8.4); gradual wavy boundary.

- Bk3—11 to 33 inches; white (10YR 8/2) gravelly loam, pale brown (10YR 6/3) moist; weak coarse prismatic structure; slightly hard, very friable, slightly sticky and nonplastic; common very fine and fine roots; common very fine pores; 5 percent rounded cobbles and 20 percent rounded pebbles; disseminated lime, common fine and medium threads and masses of lime, many distinct lime casts on fragments; violently effervescent; strongly alkaline (pH 8.6); gradual wavy boundary.
- 2C—33 to 60 inches; light gray (10YR 7/2) very gravelly sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; few very fine pores; 5 percent rounded cobbles and 45 percent rounded pebbles; disseminated lime, common fine and medium threads and masses of lime, common distinct lime casts around fragments; violently effervescent; strongly alkaline (pH 8.6).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches

*Depth to 2C material:* 20 to 40 inches

#### A horizon:

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 3 or 4 moist

Chroma—2, 3, or 4

Clay content—20 to 27 percent

Content of rock fragments—15 to 35 percent (0 to 10 percent cobbles and stones, 15 to 25 percent pebbles)

Calcium carbonate equivalent—5 to 10 percent

Reaction—pH 7.4 to 8.4

#### Bk horizon:

Hue—10YR or 2.5Y

Value—5, 6, 7, or 8 dry; 4, 5, 6, or 7 moist

Chroma—1, 2, 3, or 4

Clay content—10 to 27 percent

Content of rock fragments—10 to 35 percent (0 to 10 percent cobbles, 10 to 25 percent pebbles)

Calcium carbonate equivalent—40 to 60 percent

Reaction—pH 7.9 to 9.0

#### 2C horizon:

Hue—10YR or 2.5Y

Value—5, 6, 7, or 8 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—fine sandy loam, loam, or sandy loam

Clay content—10 to 18 percent

Content of rock fragments—35 to 60 percent (5 to 10 percent cobbles, 30 to 50 percent pebbles)

Calcium carbonate equivalent—40 to 60 percent

Reaction—pH 7.9 to 9.0

## Nestley Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Somewhat poorly drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour) above the 2C horizon and rapid (6.0 to 20.0 inches per hour) in the 2C horizon

*Landform:* Flood plains, flood-plain steps, and drainageways

*Parent material:* Recent alluvium derived from mixed rock sources

*Slope range:* 0 to 2 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Sandy-skeletal, mixed, frigid Oxyaquic Haplustolls

### Typical Pedon

Nestley silt loam, in an area of Nestley-Riverrun-Pieriver complex, 0 to 2 percent slopes, in pasture, 700 feet south and 2,100 feet east of the northwest corner of sec. 2, T. 1 N., R. 3 W.

A1—0 to 1 inch; very dark grayish brown (10YR 3/2) silt loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and moderately plastic; many very fine and fine roots and few medium roots; slightly alkaline (pH 7.6); clear wavy boundary.

A2—1 to 11 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and moderately plastic; many very fine and few fine roots; many very fine and few fine pores; slightly alkaline (pH 7.8); clear wavy boundary.

Bw—11 to 16 inches; brown (10YR 5/3) fine sandy loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine pores; 5 percent rounded pebbles; slightly alkaline (pH 7.8); abrupt smooth boundary.

2C—16 to 60 inches; light brownish gray (10YR 6/2) very gravelly sand, grayish brown (10YR 5/2) moist; single grain; loose, nonsticky and nonplastic; few very fine roots in the upper 12

inches; 50 percent pebbles; few faint lime coatings on fragments; slightly alkaline (pH 7.4).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 12 and 35 inches

*Thickness of the mollic epipedon:* 7 to 15 inches

*Depth to 2C horizon:* 9 to 25 inches

*Depth to seasonal high water table:* 24 to 42 inches

#### A horizon:

Hue—10YR or 2.5Y

Value—3 or 4 dry; 2 or 3 moist

Chroma—2 or 3

Texture—loam, silt loam, or clay loam

Clay content—14 to 32 percent

Content of rock fragments—0 to 15 percent (0 to 5 percent stones and cobbles, 0 to 10 percent pebbles)

Reaction—pH 6.6 to 7.8

#### Bw horizon:

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—fine sandy loam or sandy loam with more than 50 percent fine sand or coarser

Clay content—10 to 18 percent

Content of rock fragments—0 to 35 percent (0 to 10 percent stones and cobbles, 0 to 25 percent pebbles)

Reaction—pH 6.6 to 7.8

#### 2C horizon:

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—2 or 3

Texture—sand, loamy sand, loamy coarse sand, or coarse sand

Clay content—2 to 10 percent

Content of rock fragments—35 to 80 percent (0 to 20 percent cobbles, 35 to 70 percent pebbles)

Reaction—pH 6.6 to 8.4

## Nieman Series

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, ridges, and side slopes of mountains

*Parent material:* Residuum derived from fine grained sandstone or igneous rock

*Slope range:* 2 to 70 percent

*Elevation range:* 5,500 to 7,500 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Lithic Argicryolls

### Typical Pedon

Nieman very cobbly loam, in an area of Nieman, very stony-Rock outcrop-Libeg, bouldery, complex, 15 to 45 percent slopes, in rangeland, 700 feet north and 75 feet east of the southwest corner of sec. 18, T. 3 N., R. 4 W.

A—0 to 4 inches; brown (10YR 4/3) very cobbly loam, dark brown (10YR 3/3) moist; moderate medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; 20 percent angular cobbles and 25 percent angular pebbles; neutral (pH 6.8); clear wavy boundary.

Bt1—4 to 8 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; common faint brown (10YR 4/3) clay films on faces of peds and bridging sand grains; 25 percent angular cobbles and 30 percent angular pebbles; neutral (pH 7.0); clear wavy boundary.

Bt2—8 to 13 inches; dark grayish brown (10YR 4/2) extremely cobbly loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and many very fine roots matted in cracks and on undersides of fragments; many very fine and fine pores; common distinct clay films on faces of peds and bridging sand grains; 35 percent angular cobbles and 35 percent angular pebbles; neutral (pH 7.0).

R—13 inches; hard, fine grained igneous bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the lithic contact (if it occurs at a depth of less than 12 inches)

*Thickness of the mollic epipedon:* 7 to 12 inches

*Depth to Bt horizon:* 4 to 7 inches

*Depth to bedrock:* 10 to 20 inches

*Percent of surface covered by stones or boulders:* 0.01 to 3.0 percent

*A horizon:*

Hue—2.5Y or 10YR  
Value—3 or 4 dry; 2 or 3 moist  
Chroma—2 or 3  
Clay content—18 to 27 percent  
Content of rock fragments—15 to 50 percent (5 to 20 percent cobbles, 10 to 30 percent pebbles)  
Reaction—pH 6.6 to 7.3

*Bt horizon:*

Hue—10YR or 2.5Y  
Value—4 or 5 dry; 3 or 4 moist  
Chroma—2, 3, or 4  
Texture—loam or clay loam  
Clay content—18 to 30 percent  
Content of rock fragments—35 to 80 percent (5 to 35 percent cobbles, 30 to 45 percent pebbles)  
Reaction—pH 6.6 to 7.8

## Nippt Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour) to a depth of 15 inches and rapid (6 to 20 inches per hour) below this depth

*Landform:* Stream terraces and flood-plain steps

*Parent material:* Alluvium

*Slope range:* 0 to 4 percent

*Elevation range:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Sandy-skeletal, mixed, frigid Aridic Haplustalfs

### Typical Pedon

Nippt gravelly loam, in an area of Nippt-Geohrock gravelly loams, 2 to 4 percent slopes, in rangeland, 2,300 feet north and 1,600 feet east of the southwest corner of sec. 25, T. 12 N., R. 5 W., Lewis and Clark County, Montana:

E—0 to 3 inches; light brownish gray (10YR 6/2) gravelly loam, dark brown (10YR 4/3) moist; moderate very thin platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine vesicular pores; 15 percent pebbles; slightly alkaline; clear smooth boundary.

Bt—3 to 9 inches; brown (10YR 5/3) gravelly clay loam, dark brown (10YR 4/3) moist; moderate medium prismatic structure; hard, friable, sticky

and plastic; common very fine and fine roots; many very fine tubular and interstitial pores; many distinct dark brown (10YR 3/3 moist) clay films on faces of peds; 25 percent pebbles; slightly alkaline; clear smooth boundary.

Bk1—9 to 15 inches; light gray (10YR 7/2) extremely gravelly sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; continuous distinct lime casts on undersides of pebbles; 60 percent pebbles; violently effervescent; moderately alkaline; clear smooth boundary.

2Bk2—15 to 60 inches; light gray (10YR 7/2) extremely gravelly sand, dark brown (10YR 4/3) moist; single grain; loose, nonsticky and nonplastic; common fine and very fine roots; continuous faint lime casts on undersides of pebbles; 65 percent pebbles; strongly effervescent; strongly alkaline.

### Range in Characteristics

*Soil temperature:* 42 to 47 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bk horizon:* 5 to 10 inches

*Depth to 2Bk horizon:* 10 to 20 inches

*E horizon:*

Hue—10YR or 7.5YR  
Value—6 dry; 3 or 4 moist  
Chroma—2 or 3  
Clay content—15 to 25 percent  
Content of rock fragments—15 to 60 percent (0 to 30 percent cobbles, 5 to 30 percent pebbles)  
Reaction—pH 6.6 to 7.8

*Bt horizon:*

Hue—10YR or 7.5YR  
Value—5 or 6 dry; 3 or 4 moist  
Chroma—3 or 4  
Clay content—27 to 35 percent  
Content of rock fragments—20 to 60 percent (0 to 20 percent cobbles, 15 to 50 percent pebbles)  
Reaction—pH 6.6 to 7.8

*Bk horizon:*

Hue—10YR or 7.5YR  
Value—6, 7, or 8 dry; 4, 5, or 6 moist  
Chroma—2, 3, or 4  
Texture—sandy loam or loam  
Clay content—5 to 15 percent  
Content of rock fragments—50 to 70 percent (0 to 25 percent cobbles, 35 to 60 percent pebbles)  
Calcium carbonate equivalent—5 to 15 percent  
Reaction—pH 7.9 to 8.4

*2Bk horizon:*

Hue—10YR or 7.5YR  
 Value—6 or 7 dry; 4 or 5 moist  
 Chroma—2, 3, or 4  
 Clay content—0 to 5 percent  
 Content of rock fragments—60 to 80 percent (0 to 30 percent cobbles, 40 to 70 percent pebbles)  
 Calcium carbonate equivalent—5 to 15 percent  
 Reaction—pH 7.4 to 9.0

**Nivean Series**

*Depth class:* Shallow (10 to 20 inches)  
*Drainage class:* Well drained  
*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)  
*Landform:* Side slopes of hills and mountains  
*Parent material:* Residuum derived from welded tuff bedrock  
*Slope range:* 15 to 60 percent  
*Elevation range:* 4,500 to 6,200 feet  
*Annual precipitation:* 15 to 19 inches  
*Annual air temperature:* 36 to 40 degrees F  
*Frost-free period:* 80 to 95 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Lithic Haplustolls

**Typical Pedon**

Nivean very cobbly loam, in an area of Nivean, very stony-Rock outcrop-Rubble land complex, 25 to 60 percent slopes, in rangeland, 1,600 feet west and 2,100 feet south of the northeast corner of sec. 19, T. 6 N., R. 6 W.

A1—0 to 3 inches; grayish brown (10YR 5/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; weak very fine and fine granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; 20 percent angular tuff cobbles and 15 percent angular tuff pebbles; neutral (pH 6.8); clear wavy boundary.

A2—3 to 7 inches; grayish brown (10YR 5/2) very gravelly loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots and few coarse roots; 10 percent angular tuff cobbles and 30 percent angular tuff pebbles; neutral (pH 6.8); clear wavy boundary.

Bw—7 to 12 inches; light gray (10YR 7/2) very gravelly sandy loam, light brownish gray (10YR 6/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots and few

medium roots; many medium pores; 5 percent angular tuff cobbles and 35 percent angular tuff pebbles; slightly alkaline (pH 7.4); clear wavy boundary.

Cr—12 to 16 inches; light gray (2.5Y 7/2), poorly consolidated welded tuff bedrock.

R—16 inches; light gray (5Y 7/1), fractured, hard welded tuff bedrock.

**Range in Characteristics**

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 10 inches

*Content of volcanic glass:* More than 30 percent in the coarse silt and sand fraction of one or more horizons

*Depth to Cr horizon:* 10 to 18 inches

*Depth to R layer:* 12 to 20 inches

*Percent of surface covered by stones or boulders:* 0.1 to 3.0 percent

*A horizon:*

Hue—10YR or 2.5Y

Value—3, 4, or 5 dry; 2 or 3 moist

Chroma—1, 2, or 3

Clay content—15 to 27 percent

Content of rock fragments—35 to 45 percent (10 to 20 percent cobbles and stones, 15 to 30 percent pebbles)

Reaction—pH 6.6 to 7.8

*Bw horizon:*

Hue—10YR or 2.5Y

Value—4, 5, 6, or 7 dry; 3, 4, 5, or 6 moist

Chroma—2 or 3

Texture—loam, sandy loam, or sandy clay loam

Clay content—18 to 27 percent

Content of rock fragments—35 to 60 percent (5 to 25 percent cobbles and stones, 30 to 35 percent pebbles)

Reaction—pH 6.1 to 7.8

**Opitz Series**

*Depth class:* Moderately deep (20 to 40 inches) to weathered granite bedrock (grus) and deep (40 to 60 inches) to hard granite bedrock

*Drainage class:* Well drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Ridges, plateaus, and side slopes of mountains

*Parent material:* Slope alluvium, colluvium, and residuum derived from granite

*Slope range:* 2 to 35 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Coarse-loamy, mixed, superactive Ustic Argicryolls

### Typical Pedon

Opitz coarse sandy loam, in an area of Opitz, bouldery-Branham, very bouldery-Tuggle, very bouldery, complex, 8 to 35 percent slopes, in rangeland, 2,650 feet north and 975 feet west of the southeast corner of sec. 6, T. 3 N., R. 3 W.

A—0 to 10 inches; very dark grayish brown (10YR 3/2) coarse sandy loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; 10 percent granite pebbles; neutral (pH 6.6); clear wavy boundary.

Bt1—10 to 15 inches; brown (10YR 5/3) gravelly sandy clay loam, dark brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; common distinct clay films on faces of peds and bridging sand grains; 20 percent granite pebbles; neutral (pH 6.6); clear wavy boundary.

Bt2—15 to 22 inches; pale brown (10YR 6/3) gravelly coarse sandy loam, grayish brown (10YR 5/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, slightly sticky and nonplastic; common very fine and fine roots; many very fine and fine pores; common faint clay films on faces of peds and bridging sand grains; 30 percent granite pebbles; neutral (pH 6.8); gradual wavy boundary.

BC—22 to 36 inches; grayish brown (10YR 5/2) very gravelly coarse sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; common fine and very fine pores; 40 percent granite pebbles; neutral (pH 6.8); gradual irregular boundary.

Cr—36 to 57 inches; decomposed granite bedrock (grus) that crushes to very gravelly coarse sand.

R—57 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches

*Thickness of the mollic epipedon:* 7 to 13 inches

*Depth to Bt horizon:* 6 to 14 inches

*Depth to Cr horizon:* 20 to 40 inches

*Depth to R layer:* 40 to 60 inches

*Percent of surface covered by stones or boulders:* 0 to 0.1 percent

#### A horizon:

Hue—10YR or 2.5Y

Value—3 or 4 dry; 2 or 3 moist

Texture—coarse sandy loam or sandy loam

Clay content—12 to 15 percent

Content of rock fragments—5 to 15 percent pebbles

Reaction—pH 6.1 to 7.3

#### Bt1 horizon:

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—coarse sandy loam, sandy clay loam, or sandy loam

Clay content—15 to 22 percent

Content of rock fragments—10 to 35 percent pebbles

Reaction—pH 6.1 to 7.3

#### Bt2 horizon:

Hue—10YR or 2.5Y

Value—6 or 7 dry; 5 or 6 moist

Chroma—2, 3, or 4

Texture—coarse sandy loam or sandy loam

Clay content—15 to 18 percent

Content of rock fragments—15 to 35 percent pebbles

Reaction—pH 6.1 to 7.3

#### BC horizon:

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—coarse sandy loam, loamy coarse sand, or coarse sand

Clay content—3 to 15 percent

Content of rock fragments—15 to 50 percent pebbles

Reaction—pH 6.1 to 7.3

## Peeler Family

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, ridges, and side slopes of mountains

*Parent material:* Slope alluvium and residuum derived from granite

*Slope range:* 15 to 60 percent

*Elevation range:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Fine-loamy, mixed, superactive Eutric Glossocryalfs

### Typical Pedon

Peeler bouldery sandy loam, in an area of Peeler-Rock outcrop complex, 15 to 60 percent slopes; in a forested area, 1,900 feet west and 600 feet north of the southeast corner of sec. 7, T. 9 N., R. 3 W.

Oi—2 inches to 0; forest litter of partially decomposed needles and twigs.

E—0 to 5 inches; light brownish gray (10YR 6/2) bouldery sandy loam, grayish brown (10YR 5/2) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common fine and very fine roots and few medium roots; many very fine pores; 10 percent boulders and 10 percent granite pebbles; slightly acid (pH 6.4); clear smooth boundary.

E/B—5 to 12 inches; 80 percent light brownish gray (10YR 6/2) sandy loam, grayish brown (10YR 5/2) moist (E part); 20 percent brown (10YR 5/3) sandy loam, brown (10YR 4/3) moist (B part); moderate medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common very fine and fine roots; many very fine pores; 10 percent granite pebbles; slightly acid (pH 6.3); gradual smooth boundary.

Bt/E—12 to 21 inches; 80 percent brown (10YR 5/3) sandy clay loam, brown (10YR 4/3) moist (Bt part); 20 percent light brownish gray (10YR 6/2) sandy loam, grayish brown (10YR 5/2) moist (E part); moderate medium subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; common fine and very fine roots and few medium roots; many very fine pores; many distinct clay films on faces of peds and bridging sand grains; 10 percent granite pebbles; slightly acid (pH 6.2); gradual smooth boundary.

Bt1—21 to 29 inches; yellowish brown (10YR 5/6)

sandy clay loam, dark yellowish brown (10YR 4/4) moist; weak medium prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots and few medium and coarse roots; common very fine pores; common distinct yellowish brown (10YR 5/4) clay films on faces of peds and bridging sand grains; 5 percent granite pebbles; slightly acid (pH 6.1); gradual smooth boundary.

Bt2—29 to 45 inches; light olive brown (2.5Y 5/4) sandy loam, olive brown (2.5Y 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common very fine and fine roots and few medium and coarse roots; common very fine pores; few faint yellowish brown (10YR 5/4) clay films on faces of peds and bridging sand grains; 5 percent granite pebbles; neutral (pH 6.7); gradual wavy boundary.

C—45 to 60 inches; light brownish gray (2.5Y 6/2) gravelly sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose, nonsticky and nonplastic; few fine and very fine roots; 20 percent granite pebbles; neutral (pH 6.8).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*E horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2 or 3

Clay content—5 to 15 percent

Content of rock fragments—15 to 35 percent (5 to 15 percent boulders or stones, 0 to 5 percent cobbles, 10 to 15 percent pebbles)

Reaction—pH 5.6 to 6.5

*E/B and Bt/E horizons:*

Hue—10YR or 2.5Y

Value—5, 6, 7, or 8 dry; 4, 5, 6, or 7 moist

Chroma—2, 3, 4, 5, or 6

Clay content—18 to 30 percent

Content of rock fragments—5 to 25 percent pebbles

Reaction—pH 5.6 to 7.3

*Bt horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, 4, 5, or 6

Clay content—18 to 30 percent

Content of rock fragments—5 to 25 percent pebbles

Reaction—pH 5.6 to 7.3

*C horizon:*

Hue—2.5Y or 5Y  
 Value—4, 5, or 6 dry; 3 or 4 moist  
 Chroma—2 or 3  
 Clay content—0 to 10 percent  
 Reaction—pH 5.6 to 7.3

## Pensore Series

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, knolls, ridges, strath terraces, and side slopes of hills

*Parent material:* Residuum derived from limestone

*Slope range:* 2 to 60 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Loamy-skeletal, carbonatic, frigid Lithic Calcicusteps

### Typical Pedon

Pensore very gravelly loam, in an area of Pensore-Rock outcrop-Roto complex, 2 to 25 percent slopes, in rangeland, 2,150 feet west and 700 feet south of the northeast corner of sec. 32, T. 4 N., R. 2 W.

A—0 to 7 inches; grayish brown (10YR 5/2) very gravelly loam, brown (10YR 4/3) moist; weak very fine granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; 5 percent angular cobbles and 35 percent angular pebbles; disseminated lime, common faint lime coatings on undersides of fragments; strongly effervescent; moderately alkaline (pH 8.2); clear wavy boundary.

Bk—7 to 19 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; common very fine pores; 5 percent angular cobbles and 50 percent angular pebbles; disseminated lime, common fine and medium threads and masses of lime, many distinct lime casts on fragments; violently effervescent; moderately alkaline (pH 8.4); clear smooth boundary.

R—19 inches; hard limestone bedrock.

## Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between a depth of 6 inches and the lithic contact

*Depth to Bk horizon:* 3 to 7 inches

*Depth to bedrock:* 10 to 20 inches

*Percent of surface covered by stones or boulders:* 0 to 0.1 percent

*A horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 3, 4, or 5 moist

Chroma—2 or 3

Clay content—10 to 25 percent

Content of rock fragments—15 to 60 percent (0 to 5 percent stones and cobbles, 15 to 55 percent pebbles and channers)

Calcium carbonate equivalent—5 to 25 percent

Reaction—pH 7.9 to 8.4

*Bk horizon:*

Hue—10YR or 2.5Y

Value—7 or 8 dry; 6 or 7 moist

Chroma—2, 3, or 4

Clay content—10 to 25 percent

Content of rock fragments—35 to 60 percent (0 to 15 percent cobbles and stones, 35 to 55 percent pebbles and channers)

Calcium carbonate equivalent—40 to 60 percent (including coarse fragments less than  $\frac{3}{4}$  inch in size)

Reaction—pH 7.9 to 9.0

## Perma Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Somewhat excessively drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, escarpments, ridges, and side slopes of hills

*Parent material:* Slope alluvium and colluvium derived from mixed rock sources

*Slope range:* 2 to 60 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Haplustolls

### Typical Pedon

Perma cobbly loam, in an area of Perma, stony-

Whitlash, very stony, complex, 15 to 35 percent slopes, in rangeland, 2,590 feet east and 1,520 feet north of the southwest corner of sec. 28, T. 7 N., R. 4 W.

A1—0 to 7 inches; dark grayish brown (10YR 4/2) cobbly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; 15 percent angular cobbles and 15 percent angular pebbles; neutral (pH 6.6); clear wavy boundary.

A2—7 to 13 inches; brown (10YR 4/3) very gravelly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine pores; 10 percent angular cobbles and 45 percent rounded pebbles; neutral (pH 6.8); clear wavy boundary.

Bw1—13 to 28 inches; brown (10YR 5/3) very gravelly loam, brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; common very fine pores; 15 percent angular cobbles and 35 percent angular pebbles; neutral (pH 7.0); gradual wavy boundary.

Bw2—28 to 44 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine pores; 15 percent angular cobbles and 40 percent angular pebbles; slightly alkaline (pH 7.4); gradual wavy boundary.

BC—44 to 60 inches; very pale brown (10YR 7/3) extremely gravelly sandy loam, grayish brown (10YR 5/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; 20 percent angular cobbles and 50 percent angular pebbles; common faint lime coatings on undersides of fragments; slightly alkaline (pH 7.4).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches

*Thickness of the mollic epipedon:* 10 to 15 inches

*Percent of surface covered by stones or boulders:* 0.01 to 3.0 percent

*A horizon:*

Value—4 or 5 dry; 2 or 3 moist

Chroma—2 or 3

Clay content—15 to 27 percent

Content of rock fragments—15 to 60 percent (0 to 30 percent cobbles and stones, 10 to 50 percent pebbles)

Reaction—pH 6.1 to 7.3

*Bw horizon:*

Hue—10YR or 7.5YR

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2, 3, or 4

Texture—loam or sandy loam

Clay content—10 to 20 percent

Content of rock fragments—35 to 85 percent (0 to 50 percent cobbles and stones, 25 to 65 percent pebbles)

Reaction—pH 6.1 to 7.8

*BC horizon:*

Hue—10YR or 7.5YR

Value—4, 6, or 7 dry; 3, 4, or 5 moist

Chroma—2, 3, or 4

Texture—loam or sandy loam

Clay content—0 to 20 percent

Content of rock fragments—60 to 85 percent (10 to 50 percent cobbles and stones, 50 to 65 percent pebbles)

Calcium carbonate equivalent—0 to 10 percent

Reaction—pH 7.4 to 8.4

### Pieriver Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Somewhat poorly drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Flood plains, flood-plain steps, and drainageways

*Parent material:* Recent alluvium derived from mixed rock sources

*Slope range:* 0 to 2 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, calcareous, frigid Oxyaquic Ustifluvents

### Typical Pedon

Pieriver loam, in an area of Cardwell-Pieriver complex, 0 to 2 percent slopes, in pasture, 420 feet east and 200 feet south of the northwest corner of sec. 9, T. 1 N., R. 3 W.

A—0 to 7 inches; grayish brown (10YR 5/2) loam with

few thin strata of loamy sand, dark grayish brown (10YR 4/2) moist; weak medium granular structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine roots; disseminated lime; strongly effervescent; slightly alkaline (pH 7.8); clear smooth boundary.

C1—7 to 19 inches; light gray (10YR 5/1) loam, dark grayish brown (10YR 4/2) moist; moderate thin platy structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common fine and very fine pores; disseminated lime; strongly effervescent; moderately alkaline (pH 8.4); clear smooth boundary.

C2—19 to 38 inches; grayish brown (10YR 6/1) loam, dark grayish brown (10YR 4/2) moist; few faint light gray (N 7/) redox depletions; weak thin platy structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; common fine pores; disseminated lime; strongly effervescent; moderately alkaline (pH 8.2); clear smooth boundary.

C3—38 to 47 inches; pale brown (10YR 6/3) loamy fine sand, grayish brown (10YR 5/2) moist; few prominent yellowish red (5YR 4/6) redox concentrations; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; disseminated lime; strongly effervescent; moderately alkaline (pH 8.2); clear smooth boundary.

C4—47 to 60 inches; grayish brown (10YR 5/1) loam, dark grayish brown (10YR 4/2) moist; common prominent dark gray (N 4/) redox depletions; massive; hard, firm, slightly sticky and moderately plastic; disseminated lime; strongly effervescent; moderately alkaline (pH 8.4).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to seasonal high water table:* 24 to 42 inches

*A horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 3 or 4 moist

Chroma—2 or 3

Texture—loam, silt loam, or sandy loam; thin strata of loamy sand in some pedons

Clay content—18 to 27 percent

Content of rock fragments—0 to 10 percent pebbles

Calcium carbonate equivalent—5 to 10 percent

Reaction—pH 7.4 to 8.4

*C1, C2, and C4 horizons:*

Hue—10YR, 2.5Y, or 5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—1, 2, or 3

Texture—loam, clay loam, or fine sandy loam; thin strata of loamy fine sand, fine sand, or sand and gravel in some pedons

Clay content—18 to 30 percent

Content of rock fragments—0 to 10 percent pebbles

Calcium carbonate equivalent—5 to 10 percent

Reaction—pH 7.4 to 8.4

*C3 horizon:*

Hue—10YR or 2.5Y

Value—6 or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—sandy loam or loamy fine sand

Clay content—8 to 20 percent

Content of rock fragments—0 to 15 percent pebbles

Calcium carbonate equivalent—5 to 10 percent

Reaction—pH 7.4 to 8.4

### Placerton Series

*Depth class:* Moderately deep (20 to 40 inches) to weathered granite bedrock (grus) and deep (40 to 60 inches) to hard granite bedrock

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Ridges, divides, and side slopes of hills and mountains

*Parent material:* Local colluvium, slope alluvium, and residuum derived from granite

*Slope range:* 2 to 35 percent

*Elevation range:* 4,800 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Typic Argiustolls

### Typical Pedon

Placerton gravelly sandy clay loam, in an area of Placerton-Farnuf-Connieo complex, 8 to 15 percent slopes, in rangeland, 1,000 feet south and 900 feet west of the northeast corner of sec. 5, T. 5 N., R. 4 W.

A—0 to 7 inches; grayish brown (10YR 5/2) gravelly sandy clay loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine subangular blocky structure; soft, very friable, moderately

sticky and slightly plastic; many very fine and few fine roots; many very fine and fine pores and few medium pores; 20 percent granite pebbles; neutral (pH 6.6); clear smooth boundary.

**Bt1**—7 to 11 inches; brown (10YR 5/3) gravelly clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium and fine subangular blocky; slightly hard, friable, moderately sticky and slightly plastic; many very fine and few fine roots; many very fine and few fine pores; many faint clay films on faces of peds; 30 percent granite pebbles; neutral (pH 6.8); clear smooth boundary.

**Bt2**—11 to 21 inches; brown (10YR 5/3) gravelly sandy clay loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate medium and fine subangular blocky; slightly hard, friable, moderately sticky and slightly plastic; common very fine and few fine roots; many very fine and few fine pores; many faint clay films on faces of peds and bridging sand grains; 25 percent granite pebbles; neutral (pH 7.0); clear smooth boundary.

**Bk**—21 to 29 inches; very pale brown (10YR 7/3) gravelly sandy loam, light yellowish brown (10YR 6/4) moist; moderate medium and fine subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; few very fine roots; common very fine pores; 30 percent granite pebbles; disseminated lime, few fine masses of lime; strongly effervescent; moderately alkaline (pH 8.3); clear smooth boundary.

**Cr**—29 to 58 inches; grayish brown (2.5Y 5/2), decomposed granite bedrock (grus) that crushes to very gravelly coarse sand or loamy coarse sand.

**R**—58 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 15 inches

*Depth to Bt horizon:* 6 to 16 inches

*Depth to Bk horizon:* 15 to 30 inches

*Depth to Cr horizon:* 20 to 40 inches

*Depth to R layer:* 40 to 60 inches

#### *A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 2 or 3 moist

Chroma—2 or 3

Texture—sandy loam or sandy clay loam

Clay content—10 to 25 percent

Content of rock fragments—5 to 25 percent pebbles

Reaction—pH 6.1 to 7.3

#### *Bt horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 3, 4, or 5 moist

Chroma—3 or 4

Texture—loam, sandy clay loam, or clay loam

Clay content—20 to 30 percent

Content of rock fragments—5 to 30 percent pebbles

Reaction—pH 6.6 to 7.8

#### *Bk horizon:*

Hue—10YR or 2.5Y

Value—6 or 7 dry; 5 or 6 moist

Chroma—2, 3, or 4

Texture—coarse sandy loam, sandy loam, or sandy clay loam

Clay content—10 to 25 percent

Content of rock fragments—10 to 35 percent pebbles

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.9 to 8.4

### Quaint Series

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Somewhat excessively drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Ridges, plateaus, and side slopes of hills

*Parent material:* Slope alluvium and residuum derived from hard, red shale bedrock

*Slope range:* 2 to 45 percent

*Elevation range:* 4,600 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 95 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Lithic Haplustepts

### Typical Pedon

Quaint channery loam, in an area of Quaint-Rock outcrop-Redfist complex, 4 to 25 percent slopes, in rangeland, 300 feet north and 1,200 feet west of the southeast corner of sec. 13, T. 4 N., R. 2 W.

**A**—0 to 5 inches; weak red (2.5YR 4/2) channery loam, dusky red (2.5YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine

and fine roots; 25 percent channers; slightly alkaline (pH 7.8); clear wavy boundary.

Bk1—5 to 11 inches; weak red (10R 5/3) very channery loam, dark reddish brown (2.5YR 3/4) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, nonsticky and nonplastic; many fine and very fine roots; common very fine and fine pores; 5 percent flagstones and 35 percent channers; disseminated lime, few faint lime coatings on fragments; strongly effervescent; moderately alkaline (pH 8.3); clear wavy boundary.

Bk2—11 to 14 inches; weak red (10R 5/3) very channery loam, dark reddish brown (2.5YR 3/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine pores; 5 percent flagstones and 55 percent channers; disseminated lime, common distinct lime coatings on undersides of fragments; strongly effervescent; moderately alkaline (pH 8.3); clear smooth boundary.

R—14 inches; weak, red (10R 5/3), fractured, hard shale.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the lithic contact

*Depth to Bk horizon:* 3 to 7 inches

*Depth to bedrock:* 10 to 20 inches

*Percent of surface covered by stones or boulders:* 0 to 3 percent

#### *A horizon:*

Hue—2.5YR, 5YR, or 7.5YR

Value—4, 5, or 6 dry

Chroma—2 or 3

Clay content—18 to 27 percent

Content of rock fragments—15 to 35 percent (0 to 5 percent flagstones, 15 to 30 percent channers)

Reaction—pH 6.6 to 7.8

#### *Bk horizon:*

Hue—10R, 2.5YR, or 7.5YR

Value—5 or 6 dry; 3, 4, or 5 moist

Chroma—3 or 4

Clay content—18 to 27 percent

Content of rock fragments—35 to 60 percent (5 to 10 percent flagstones, 30 to 55 percent channers)

Calcium carbonate equivalent—3 to 10 percent  
Reaction—pH 7.4 to 8.4

## Quincreek Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, knolls, and side slopes of hills

*Parent material:* Slope alluvium and residuum derived from fractured, red shale bedrock

*Slope range:* 2 to 8 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 95 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Argiustolls

### Typical Pedon

Quincreek channery loam, 2 to 8 percent slopes, in rangeland, 400 feet south and 2,200 feet east of the northwest corner of sec. 12, T. 4 N., R. 2 W.

A—0 to 3 inches; brown (7.5YR 5/2) channery loam, dark brown (7.5YR 3/2) moist; moderate medium granular structure; soft, very friable, slightly sticky and nonplastic; common very fine and fine roots; 20 percent shale channers; neutral (pH 7.3); clear wavy boundary.

Bt—3 to 9 inches; dark brown (7.5YR 4/2) channery clay loam, dark brown (7.5YR 3/2) moist; strong medium prismatic structure parting to moderate medium subangular blocky; hard, firm, moderately sticky and slightly plastic; many very fine and fine roots; common fine and very fine pores; common distinct brown (7.5YR 4/2) clay films on faces of peds; 20 percent shale channers; slightly alkaline (pH 7.4); gradual wavy boundary.

Bk1—9 to 19 inches; pinkish gray (7.5YR 6/2) very channery loam, brown (7.5YR 5/2) moist; moderate medium and coarse prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine pores; 40 percent shale channers; disseminated lime, common fine masses and threads of lime, common distinct lime coatings on fragments; violently effervescent; moderately alkaline (pH 8.2); gradual wavy boundary.

Bk2—19 to 27 inches; brown (7.5YR 5/2) very channery loam, brown (7.5YR 4/2) moist; weak coarse prismatic structure; slightly hard, very friable, slightly sticky and nonplastic; few very fine

roots; common very fine pores; 55 percent shale channers; disseminated lime, common fine masses of lime, common faint lime coatings on fragments; violently effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary.  
R—27 inches; reddish brown (5YR 4/3), hard, fractured shale.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 6 to 10 inches

*Depth to Bt horizon:* 3 to 6 inches

*Depth to Bk horizon:* 7 to 9 inches

*Depth to bedrock:* 20 to 40 inches

#### *A horizon:*

Hue—5YR, 7.5YR, or 10YR

Value—4 or 5 dry; 3 or 4 moist

Chroma—2 or 3

Clay content—18 to 27 percent

Content of rock fragments—5 to 20 percent channers

Reaction—pH 6.6 to 7.8

#### *Bt horizon:*

Hue—5YR or 7.5YR

Value—4 or 5 dry; 3 or 4 moist

Chroma—2 or 3

Texture—loam or clay loam

Clay content—25 to 35 percent

Content of rock fragments—15 to 35 percent channers

Reaction—pH 6.6 to 7.8

#### *Bk1 horizon:*

Hue—5YR or 7.5YR

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—loam or clay loam

Clay content—22 to 30 percent

Content of rock fragments—35 to 50 percent channers

Calcium carbonate equivalent—15 to 25 percent

Reaction—pH 7.9 to 8.4

#### *Bk2 horizon:*

Hue—5YR or 7.5YR

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Clay content—18 to 27 percent

Content of rock fragments—35 to 65 percent channers

Calcium carbonate equivalent—5 to 20 percent

Reaction—pH 7.9 to 8.4

## Raghorn Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans and side slopes of hills

*Parent material:* Alluvium derived from granite

*Slope range:* 0 to 70 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Aridic Haplustalfs

### Typical Pedon

Raghorn sandy loam, 4 to 8 percent slopes, in rangeland, 870 feet north and 1,280 feet east of the southwest corner of sec. 26, T. 2 N., R. 5 W.

A1—0 to 3 inches; grayish brown (10YR 5/2) sandy loam, dark brown (10YR 3/3) moist; moderate medium granular structure; slightly hard, friable, slightly sticky and nonplastic; many very fine and fine roots; slightly alkaline (pH 7.6); clear smooth boundary.

A2—3 to 7 inches; brown (10YR 5/3) sandy loam, dark yellowish brown (10YR 3/4) moist; moderate coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many fine and very fine roots and few medium roots; slightly alkaline (pH 7.8); clear smooth boundary.

Bt—7 to 12 inches; brown (10YR 5/3) sandy clay loam, dark yellowish brown (10YR 3/4) moist; strong coarse prismatic structure parting to strong medium and coarse angular blocky; hard, firm, moderately sticky and moderately plastic; many fine and very fine roots; common fine and very fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; slightly alkaline (pH 7.6); gradual smooth boundary.

BC—12 to 20 inches; pale brown (10YR 6/3) sandy loam, dark yellowish brown (10YR 4/4) moist; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, nonsticky and nonplastic; many very fine and fine roots; slightly alkaline (pH 7.6); gradual smooth boundary.

2C1—20 to 44 inches; pale brown (10YR 6/3) loamy coarse sand, yellowish brown (10YR 5/4) moist; single grain; loose, nonsticky and nonplastic; few or common very fine roots; disseminated lime;

slightly effervescent; slightly alkaline (pH 7.6); clear smooth boundary.

3C2—44 to 60 inches; pale brown (10YR 6/3), stratified sandy loam and loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; slightly alkaline (pH 7.8).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bt horizon:* 6 to 11 inches

*Percent of surface covered by boulders:* 0 to 0.1 percent

*A horizon:*

Chroma—2, 3, or 4

Clay content—10 to 20 percent

Content of rock fragments—0 to 25 percent (0 to 15 percent pebbles, 0 to 10 percent cobbles)

Reaction—pH 6.6 to 7.8

*Bt horizon:*

Chroma—3 or 4

Texture—sandy loam or sandy clay loam

Clay content—18 to 25 percent

Content of rock fragments—0 to 15 percent (0 to 15 percent pebbles, 0 to 3 percent cobbles)

Reaction—pH 6.6 to 7.8

*BC horizon:*

Chroma—3 or 4

Texture—fine sandy loam, coarse sandy loam, or sandy loam

Clay content—5 to 15 percent

Reaction—pH 7.4 to 8.4

*C horizon:*

Chroma—3 or 4

Texture—loamy coarse sand and stratified sandy loam and loam

Clay content—5 to 18 percent

Reaction—pH 7.4 to 8.4

### Ratiopeak Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderately slow (0.2 to 0.6 inch per hour)

*Landform:* Alluvial fans and side slopes of mountains

*Parent material:* Slope alluvium and colluvium derived from hard, fine grained sandstone or fine grained igneous rock

*Slope range:* 1 to 15 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Ustic Argicryolls

### Typical Pedon

Ratiopeak gravelly loam, in an area of Ratiopeak-Tiban gravelly loams, 4 to 15 percent slopes, bouldery, in rangeland, 1,650 feet south and 1,000 feet east of the northwest corner of sec. 3, T. 5 N., R. 2 W.

A1—0 to 3 inches; very dark grayish brown (10YR 3/2) gravelly loam, black (10YR 2/1) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine and fine pores; 20 percent angular pebbles; slightly acid (pH 6.4); clear wavy boundary.

A2—3 to 10 inches; very dark grayish brown (10YR 3/2) gravelly loam, very dark brown (10YR 2/2) moist; strong medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine and fine pores; 25 percent angular pebbles; neutral (pH 6.6); clear wavy boundary.

Bt1—10 to 15 inches; brown (10YR 4/3) very gravelly clay loam, dark brown (10YR 3/3) moist; strong medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores and few medium pores; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; 40 percent angular pebbles; neutral (pH 7.0); gradual wavy boundary.

Bt2—15 to 26 inches; pale brown (10YR 6/3) very gravelly clay loam, brown (10YR 5/3) moist; strong medium prismatic structure parting to moderate medium subangular blocky; hard, firm, moderately sticky and moderately plastic; many very fine and fine roots and few medium roots; many very fine and fine pores; common distinct grayish brown (10YR 5/2) clay films on faces of peds; 40 percent angular pebbles; neutral (pH 7.2); gradual wavy boundary.

Bt3—26 to 35 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 5/3) moist; moderate coarse prismatic structure; hard, firm, moderately sticky and moderately plastic; common very fine and fine roots; common very fine and fine pores and few medium pores; few distinct clay films on

faces of peds; 45 percent angular pebbles; slightly alkaline (pH 7.8); gradual smooth boundary.

Bk—35 to 60 inches; very pale brown (10YR 7/3) very gravelly loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine and fine pores; 5 percent angular cobbles and 50 percent angular pebbles; disseminated lime, common fine masses and threads of lime, common distinct lime casts on undersides of fragments; strongly effervescent; moderately alkaline (pH 8.3).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 10 to 15 inches

*Depth to Bt horizon:* 6 to 11 inches

*Depth to Bk horizon:* 25 to 40 inches

*Percent of surface covered by stones/boulders:* 0.01 to 0.1 percent

#### *A horizon:*

Hue—10YR, 7.5YR, or 2.5Y

Value—3 or 4 dry; 2 or 3 moist

Chroma—1 or 2

Clay content—18 to 27 percent

Content of rock fragments—15 to 35 percent (0 to 10 percent stones and cobbles, 15 to 25 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *Bt horizon:*

Hue—7.5YR or 10YR

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—3, 4, 5, or 6

Texture—loam or clay loam

Clay content—25 to 35 percent

Content of rock fragments—35 to 60 percent (0 to 15 percent stones and cobbles, 35 to 45 percent pebbles)

Reaction—pH 6.1 to 7.8

#### *Bk horizon:*

Hue—7.5YR or 10YR

Value—6 or 7 dry; 5 or 6 moist

Chroma—3 or 4

Texture—loam or clay loam

Clay content—18 to 30 percent

Content of rock fragments—35 to 70 percent (0 to 20 percent stones and cobbles, 30 to 50 percent pebbles)

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.4 to 8.4

## Raynesford Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, swales, and drainageways

*Parent material:* Slope alluvium and colluvium derived from mixed rock sources with a high percentage of limestone fragments

*Slope range:* 4 to 25 percent

*Elevation range:* 5,500 to 7,500 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Fine-loamy, carbonatic Calcic Haplocryolls

### Typical Pedon

Raynesford silt loam, 4 to 15 percent slopes, in rangeland, 1,925 feet west and 2,175 feet north of the southeast corner of sec. 2, T. 5 N., R. 2 W.

A1—0 to 2 inches; very dark grayish brown (10YR 3/2) silt loam, black (10YR 2/1) moist; moderate very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; 5 percent pebbles; slightly acid (pH 6.4); clear smooth boundary.

A2—2 to 5 inches; very dark grayish brown (10YR 3/2) silt loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots and few medium roots; 5 percent pebbles; neutral (pH 6.6); clear wavy boundary.

Bw1—5 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, very dark brown (10YR 2/2) moist; strong medium prismatic structure parting to strong fine subangular blocky; many very fine and fine roots and few medium roots; many very fine and fine pores; neutral (pH 6.8); clear wavy boundary.

Bw2—10 to 15 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; strong coarse prismatic structure parting to strong medium subangular blocky; many very fine and fine roots and common medium roots; many very fine and fine pores; 10 percent pebbles; slightly alkaline (pH 7.6); clear wavy boundary.

Bk1—15 to 36 inches; pale brown (10YR 6/3) gravelly silt loam, brown (10YR 5/3) moist; moderate coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium

and coarse roots; many very fine and fine pores; 25 percent pebbles; disseminated lime, common fine and medium threads and masses of lime, common faint lime coatings on undersides of fragments; violently effervescent; moderately alkaline (pH 8.4); gradual wavy boundary.

Bk<sub>2</sub>—36 to 60 inches; light gray (10YR 7/2) gravelly silt loam, light olive brown (2.5Y 5/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots and few medium roots; common fine and very fine pores; 20 percent pebbles; disseminated lime, common fine threads and masses of lime, common faint lime coatings on fragments; violently effervescent; moderately alkaline (pH 8.4).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 12 to 16 inches

*Depth to Bk horizon:* 12 to 20 inches

#### A horizon:

Hue—10YR or 2.5Y

Value—3 or 4 dry; 2 or 3 moist

Chroma—1 or 2

Clay content—18 to 27 percent

Content of rock fragments—0 to 10 percent pebbles

Reaction—pH 6.1 to 7.3

#### Bw horizon:

Hue—2.5Y, 10YR, or 7.5YR

Value—3, 4, or 5 dry; 2 or 3 moist

Chroma—1, 2, or 3

Texture—silt loam or loam

Clay content—15 to 27 percent

Content of rock fragments—0 to 10 percent pebbles

Reaction—pH 6.6 to 7.8

#### Bk horizon:

Hue—2.5Y, 10YR, or 7.5YR

Value—6, 7, or 8 dry; 5, 6, or 7 moist

Chroma—2, 3, or 4

Texture—silt loam or loam

Clay content—10 to 27 percent

Content of rock fragments—15 to 35 percent (0 to 5 percent cobbles, 15 to 30 percent pebbles)

Calcium carbonate equivalent—40 to 50 percent

Reaction—pH 7.9 to 8.4

## Redfern Series

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, ridges, divides, and side slopes of mountains

*Parent material:* Residuum derived from hard, fine grained sandstone or fine grained igneous rock

*Slope range:* 15 to 70 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Lithic Haplocryalfs

### Typical Pedon

Redfern very cobbly loam, in an area of Redfern, bouldery-Rock outcrop-Tigeron, very bouldery, complex, 25 to 60 percent slopes; in a forested area, 1,200 feet south and 1,800 feet east of the northwest corner of sec. 8, T. 5 N., R. 3 W.

Oi— $\frac{1}{2}$  inch to 0; partially decomposed needles, twigs, and leaves.

A—0 to 3 inches; light brownish gray (2.5Y 6/2) very cobbly loam, dark grayish brown (2.5Y 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium roots; many very fine and fine pores; 20 percent angular cobbles and 30 percent angular pebbles; neutral (pH 6.9); clear smooth boundary.

E—3 to 7 inches; light gray (10YR 7/2) extremely gravelly loam, brown (10YR 5/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium roots; many very fine and fine pores; 20 percent angular cobbles and 40 percent angular pebbles; neutral (pH 6.8); clear smooth boundary.

Bt—7 to 18 inches; yellowish brown (10YR 5/4) extremely gravelly clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; common very fine and fine roots and few medium roots; common very fine and fine pores; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds and

bridging sand grains; 20 percent angular cobbles and 45 percent angular pebbles; moderately acid (pH 5.8); clear wavy boundary.

R—18 inches; very dark gray (5Y 3/1), hard, fine grained igneous bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the lithic contact (if it occurs at a depth of less than 12 inches)

*Depth to Bt horizon:* 3 to 13 inches

*Depth to bedrock:* 10 to 20 inches

*Percent of surface covered by stones/boulders:* 0.01 to 20 percent

#### A horizon:

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2 or 3

Clay content—15 to 27 percent

Content of rock fragments—35 to 60 percent (5 to 20 percent stones and cobbles, 30 to 40 percent pebbles)

Reaction—pH 6.1 to 7.3

#### E horizon:

Hue—10YR or 2.5Y

Value—6 or 7 dry; 5 or 6 moist

Chroma—2 or 3

Texture—loam or sandy loam

Clay content—15 to 25 percent

Content of rock fragments—35 to 65 percent (0 to 5 percent stones, 10 to 20 percent cobbles, 25 to 40 percent pebbles)

Reaction—pH 6.1 to 7.3

#### Bt horizon:

Hue—7.5YR, 10YR, or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—loam, clay loam, or sandy clay loam

Clay content—23 to 35 percent

Content of rock fragments—35 to 70 percent (0 to 15 percent stones, 15 to 30 percent cobbles, 20 to 45 percent pebbles)

Reaction—pH 5.6 to 7.3

### Redfist Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, knolls, and side slopes of hills

*Parent material:* Local colluvium, slope alluvium, and residuum derived from red shale bedrock

*Slope range:* 2 to 35 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 95 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Calcic Haplustepts

### Typical Pedon

Redfist channery loam, in an area of Redfist-Quaint channery loams, 2 to 8 percent slopes, in rangeland, 2,500 feet south and 150 feet west of the northeast corner of sec. 34, T. 4 N., R. 2 W.

A—0 to 4 inches; dark brown (7.5YR 4/2) channery loam, dark reddish brown (5YR 3/3) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; 20 percent shale channers; disseminated lime; strongly effervescent; slightly alkaline (pH 7.8); clear wavy boundary.

Bk1—4 to 11 inches; light reddish brown (5YR 6/3) channery loam, reddish brown (5YR 4/4) moist; moderate medium prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; many very fine pores; 30 percent shale channers; disseminated lime, common distinct lime coatings on undersides of fragments; violently effervescent; moderately alkaline (pH 8.4); gradual wavy boundary.

Bk2—11 to 29 inches; reddish gray (5YR 5/2) very channery loam, dark reddish brown (5YR 3/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine pores; 50 percent shale channers; disseminated lime, many distinct lime crusts on undersides of fragments; violently effervescent; moderately alkaline (pH 8.0); clear wavy boundary.

R—29 inches; dark reddish gray (5YR 4/2), fractured shale bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bk horizon:* 4 to 7 inches

*Depth to bedrock:* 20 to 40 inches

*Percent of surface covered by boulders:* 0 to 0.1 percent

*A horizon:*

Hue—5YR, 7.5YR, or 10YR

Value—3 or 4

Chroma—2, 3, or 4

Clay content—15 to 25 percent

Content of rock fragments—15 to 25 percent channers

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 6.1 to 8.4

*Bk1 horizon:*

Hue—2.5YR or 5YR

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—2, 3, 4, or 6

Clay content—15 to 25 percent

Content of rock fragments—10 to 40 percent channers

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.4 to 8.4

*Bk2 horizon:*

Hue—2.5YR, 5YR, or 7.5YR

Value—5, 6, or 7 dry; 3, 4, or 5 moist

Chroma—2, 3, 4, or 6

Clay content—15 to 25 percent

Content of rock fragments—35 to 60 percent channers

Calcium carbonate equivalent—15 to 25 percent

Reaction—pH 7.9 to 8.4

## Releep Series

*Depth class:* Moderately deep (20 to 40 inches) to weathered granite bedrock (grus) and deep (40 to 60 inches) to hard granite bedrock

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Ridges and side slopes of mountains

*Parent material:* Local colluvium, slope alluvium, and residuum derived from granite

*Slope range:* 15 to 35 percent

*Elevation range:* 5,500 to 7,500 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Fine-loamy, mixed, superactive Ustic Glossocryalfs

## Typical Pedon

Releep cobbly sandy loam, in an area of Releep, very bouldery-Kurrie, very bouldery-Rock outcrop complex, 15 to 35 percent slopes; in a forested area, 2,100 feet south and 2,600 feet west of the northeast corner of sec. 18, T. 9 N., R. 3 W.

Oi—2 inches to 0; partially decomposed needles, twigs, and leaves.

A—0 to 4 inches; brown (10YR 5/3) cobbly sandy loam, dark brown (10YR 3/3) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine and common fine roots; many very fine and fine pores; 15 percent cobbles and 15 percent granite pebbles; slightly acid (pH 6.4); clear smooth boundary.

E—4 to 11 inches; light gray (2.5Y 7/2) cobbly sandy loam, grayish brown (2.5Y 5/2) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine, common fine, and few medium roots; many very fine and fine pores; 15 percent cobbles and 15 percent granite pebbles; slightly acid (pH 6.2); clear wavy boundary.

Bt/E—11 to 16 inches; 70 percent light yellowish brown (2.5Y 6/4) cobbly sandy clay loam, light olive brown (2.5Y 5/4) moist (Bt part); 30 percent light gray (2.5Y 7/2) cobbly coarse sandy loam, grayish brown (2.5Y 5/2) moist (E part); weak medium and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, common fine, and few medium roots; many very fine and few fine pores; many faint clay films bridging sand grains in the Bt part; 15 percent cobbles and 5 percent granite pebbles; neutral (pH 6.6); clear wavy boundary.

Bt—16 to 29 inches; light yellowish brown (2.5Y 6/4) cobbly sandy clay loam, light olive brown (2.5Y 5/4) moist; moderate medium prismatic structure parting to moderate medium and fine subangular blocky; slightly hard, friable, moderately sticky and slightly plastic; many very fine roots and few fine and medium roots; many very fine and fine pores; many faint clay films bridging sand grains; 15 percent cobbles and 5 percent granite pebbles; slightly acid (pH 6.5); clear wavy boundary.

BC—29 to 38 inches; light brownish gray (2.5Y 6/2) gravelly sandy loam, grayish brown (2.5Y 5/2) moist; weak coarse subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; few

very fine and fine roots; common very fine and few fine pores; 20 percent granite pebbles; neutral (pH 6.8); clear wavy boundary.

Cr—38 to 46 inches; grayish brown (2.5Y 5/2), decomposed granite bedrock (grus) that crushes to very gravelly loamy coarse sand.

R—46 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bt horizon:* 8 to 20 inches

*Depth to Cr horizon:* 20 to 40 inches

*Depth to R layer:* 40 to 60 inches

*Percent of surface covered by stones/boulders:* 0.1 to 3.0 percent

#### *A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 3 or 4 moist

Chroma—2, 3, or 4

Clay content—10 to 20 percent

Content of rock fragments—15 to 35 percent (0 to 5 percent stones, 10 to 15 percent cobbles, 5 to 15 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *E horizon:*

Hue—10YR or 2.5Y

Value—6 or 7 dry; 5 or 6 moist

Chroma—1, 2, or 3

Texture—coarse sandy loam or sandy loam

Clay content—10 to 20 percent

Content of rock fragments—10 to 35 percent (0 to 5 percent stones, 5 to 15 percent cobbles, 5 to 15 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *Bt/E horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry, 4 or 5 moist (Bt part); 6 or 7 dry, 5 or 6 moist (E part)

Chroma—2, 3, or 4 (Bt part); 1, 2, or 3 (E part)

Texture (mixed)—coarse sandy loam or sandy clay loam

Clay content—18 to 25 percent

Content of rock fragments—10 to 35 percent (5 to 20 percent cobbles, 5 to 15 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *Bt horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—sandy clay loam or clay loam

Clay content—20 to 30 percent

Content of rock fragments—10 to 35 percent (5 to 20 percent cobbles, 5 to 15 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *BC horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—coarse sandy loam or sandy loam

Clay content—10 to 20 percent

Content of rock fragments—10 to 35 percent (0 to 5 percent cobbles, 10 to 25 percent pebbles, mostly less than 7 mm in diameter)

Reaction—pH 6.1 to 7.3

## Rencot Series

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, strath terraces, and side slopes of hills

*Parent material:* Residuum derived from hard, fine grained sandstone or igneous rock

*Slope range:* 2 to 70 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Lithic Calcustepts

### Typical Pedon

Rencot gravelly loam, in an area of Rencot-Rock outcrop-Rencot, stony, complex, 8 to 25 percent slopes, in rangeland, 1,400 feet east and 400 feet north of the southwest corner of sec. 15, T. 4 N., R. 2 W.

A—0 to 4 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate medium granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots and few medium roots; 5 percent angular cobbles and 25 percent angular pebbles; slightly alkaline (pH 7.4); clear smooth boundary.

Bk1—4 to 10 inches; light yellowish brown (10YR 6/4) very gravelly loam, yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots and common medium roots; many very fine and fine

pores; 10 percent angular cobbles and 35 percent angular pebbles; disseminated lime, common fine and medium threads and masses of lime, common faint lime coatings on undersides of fragments; violently effervescent; moderately alkaline (pH 8.4); clear wavy boundary.

Bk2—10 to 19 inches; light yellowish brown (10YR 6/4) extremely gravelly sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots matted between fragments; 20 percent angular cobbles and 50 percent angular pebbles; disseminated lime, many distinct lime coatings on fragments; violently effervescent; strongly alkaline (pH 8.6); clear wavy boundary.

R—19 inches; fractured, hard, fine grained sandstone bedrock.

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the lithic contact (if it occurs at a depth of less than 12 inches)

*Depth to Bk horizon:* 3 to 8 inches

*Depth to bedrock:* 10 to 20 inches

*Percent of surface covered by stones/boulders:* 0 to 3 percent

#### A horizon:

Hue—7.5YR, 10YR, or 2.5Y

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2 or 3

Clay content—15 to 27 percent

Content of rock fragments—15 to 60 percent (0 to 30 percent cobbles and stones, 15 to 50 percent pebbles)

Calcium carbonate equivalent—0 to 10 percent

Reaction—pH 7.4 to 8.4

#### Bk horizon:

Hue—7.5YR, 10YR, or 2.5Y

Value—6, 7, or 8 dry; 5, 6, or 7 moist

Chroma—2, 3, or 4

Texture—loam or sandy loam

Clay content—15 to 27 percent

Content of rock fragments—35 to 70 percent (0 to 30 percent cobbles and stones, 35 to 60 percent pebbles)

Calcium carbonate equivalent—15 to 40 percent

Reaction—pH 7.9 to 9.0

### Repkie Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Somewhat excessively drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Escarpments, ridges, and side slopes of hills and mountains

*Parent material:* Colluvium derived mainly from fine grained igneous rocks and granite

*Slope range:* 25 to 60 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 90 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Haplustepts

### Typical Pedon

Repkie very gravelly coarse sandy loam, in an area of Repkie, very stony-Yreka, stony-Skyview, very bouldery, complex, 25 to 60 percent slopes; in a forested area, 900 feet south and 1,100 feet west of the northeast corner of sec. 3, T. 8 N., R. 4 W.

Oi—1 inch to 0; partially decomposed needles, twigs, and leaves.

A—0 to 7 inches; grayish brown (10YR 5/2) very gravelly coarse sandy loam, dark grayish brown (10YR 4/2) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine roots and few fine and medium roots; many very fine and few fine pores; 45 percent pebbles; neutral (pH 7.0); clear wavy boundary.

E/Bw—7 to 18 inches; 70 percent very pale brown (10YR 7/3) very cobbly coarse sandy loam, brown (10YR 5/3) moist (E part); 30 percent brown (10YR 5/3) very cobbly coarse sandy loam, brown (10YR 4/3) moist (Bw part); weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine roots and few fine and medium roots; many very fine and few fine pores; 20 percent cobbles and 35 percent pebbles; neutral (pH 6.7); clear wavy boundary.

Bw—18 to 42 inches; brown (10YR 5/3) very gravelly coarse sandy loam, brown (10YR 4/3) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common very fine roots and few fine and medium roots;

common very fine and few fine pores; 15 percent cobbles and 40 percent pebbles; neutral (pH 6.6); clear wavy boundary.

BC—42 to 60 inches; pale brown (10YR 6/3) very gravelly coarse sandy loam, grayish brown (10YR 5/2) moist; massive; soft, very friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine and fine pores; 10 percent cobbles and 40 percent pebbles; neutral (pH 6.6).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches

*Percent of surface covered by stones:* 0.1 to 3.0 percent

*A horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2, 3, or 4

Clay content—10 to 18 percent

Content of rock fragments—35 to 60 percent (0 to 5 percent stones, 0 to 10 percent cobbles, 35 to 45 percent pebbles)

Reaction—pH 6.1 to 7.3

*E/Bw horizon:*

Hue—10YR or 2.5Y

Value—6 or 7 dry, 5 or 6 moist (E part); 5 or 6 dry, 4 or 5 moist (Bw part)

Chroma—1, 2, or 3 (E part); 2, 3, or 4 (Bw part)

Texture—coarse sandy loam or sandy loam

Clay content—10 to 18 percent

Content of rock fragments—35 to 60 percent (0 to 5 percent stones, 10 to 20 percent cobbles, 25 to 35 percent pebbles)

Reaction—pH 6.1 to 7.3

*Bw horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—coarse sandy loam or sandy loam

Clay content—10 to 18 percent

Content of rock fragments—35 to 60 percent (10 to 20 percent cobbles, 25 to 40 percent pebbles)

Reaction—pH 6.1 to 7.3

*BC horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—coarse sandy loam or sandy loam

Clay content—10 to 18 percent

Content of rock fragments—35 to 60 percent (5 to 10 percent cobbles, 30 to 50 percent pebbles)

Reaction—pH 6.1 to 7.3

### Riverrun Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Moderately well drained

*Permeability:* Rapid (6.0 to 20.0 inches per hour)

*Landform:* Flood plains, flood-plain steps, and drainageways

*Parent material:* Recent alluvium derived from mixed rock sources

*Slope range:* 0 to 2 percent

*Elevation range:* 3,800 to 5,500 feet

*Annual precipitation:* 10 to 16 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 80 to 115 days

**Taxonomic classification:** Sandy-skeletal, mixed, frigid Oxyaquic Ustifluvents

### Typical Pedon

Riverrun gravelly sandy loam, in an area of Cardwell-Riverrun-Pieriver complex, 0 to 2 percent slopes, in rangeland, 2,100 feet north and 1,150 feet west of the southeast corner of sec. 2, T. 1 N., R. 4 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) gravelly sandy loam, very dark brown (10YR 2/2) moist; weak medium granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and common fine roots; 15 percent rounded pebbles; neutral (pH 6.8); abrupt smooth boundary.

C1—4 to 9 inches; light brownish gray (10YR 6/2) gravelly loamy sand, grayish brown (10YR 5/2) moist; single grain; loose, nonsticky and nonplastic; common very fine and few fine roots; 20 percent rounded pebbles; neutral (pH 7.2); clear smooth boundary.

C2—9 to 57 inches; light brownish gray (10YR 6/2) very gravelly loamy coarse sand, grayish brown (10YR 5/2) moist; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; 50 percent rounded pebbles; neutral (pH 7.2); gradual wavy boundary.

C3—57 to 60 inches; light brownish gray (2.5Y 6/2) loamy sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; slightly alkaline (pH 7.8).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 12 and 36 inches

*Depth to the water table:* 42 to 60 inches for extended periods during late spring or early summer

*Note:* A saline phase is recognized.

#### A horizon:

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 2, 3, 4, or 5 moist

Chroma—2 or 3

Texture—loam, sandy loam, or fine sandy loam

Clay content—6 to 26 percent

Content of rock fragments—0 to 50 percent (0 to 10 percent stones and cobbles, 0 to 25 percent pebbles)

Electrical conductivity—4 to 16 mmhos/cm (saline phase)

Sodium adsorption ratio—0 to 4 (saline phase)

Reaction—pH 6.6 to 7.8; pH 6.6 to 7.8 in the saline phase

#### C1 and C3 horizons:

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—2 or 3

Texture—sand, loamy sand, loamy coarse sand, or coarse sand

Clay content—2 to 10 percent

Content of rock fragments—0 to 35 percent (0 to 10 percent stones and cobbles, 0 to 35 percent pebbles)

Electrical conductivity—2 to 16 mmhos/cm (saline phase)

Sodium adsorption ratio—0 to 4 (saline phase)

Reaction—pH 6.6 to 8.4; pH 6.6 to 8.4 in the saline phase

#### C2 horizon:

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—2 or 3

Texture—sand, loamy sand, loamy coarse sand, or coarse sand

Clay content—2 to 10 percent

Content of rock fragments—35 to 80 percent (0 to 20 percent stones and cobbles, 35 to 70 percent pebbles)

Electrical conductivity—2 to 8 mmhos/cm (saline phase)

Sodium adsorption ratio—0 to 4 (saline phase)

Reaction—pH 6.6 to 8.4; pH 6.6 to 8.4 in the saline phase

### Rivra Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderately rapid (2 to 6 inches per hour) to a depth of 6 inches and rapid (6 to 20 inches per hour) below this depth

*Landform:* Flood plains, flood-plain steps, and drainageways

*Parent material:* Alluvium

*Slope range:* 0 to 2 percent

*Elevation range:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Sandy-skeletal, mixed, frigid Aridic Ustifluvents

### Typical Pedon

Rivra very gravelly loam, in an area of Ryell-Rivra complex, 0 to 3 percent slopes, in rangeland, 1,600 feet south and 2,200 feet west of the northeast corner of sec. 1, T. 21 N., R. 7 W., Lewis and Clark County, Montana:

Ap—0 to 6 inches; light brownish gray (10YR 6/2) very gravelly loam, dark brown (10YR 4/3) moist; weak very thin platy structure parting to weak very fine granular; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; 25 percent pebbles and 10 percent cobbles; disseminated lime; strongly effervescent; slightly alkaline; clear smooth boundary.

C1—6 to 20 inches; light brownish gray (10YR 6/2) extremely gravelly loamy sand, dark brown (10YR 4/3) moist; single grain; loose, slightly sticky and nonplastic; common very fine roots and few fine and medium roots; 50 percent pebbles and 20 percent cobbles; disseminated lime; strongly effervescent; moderately alkaline; gradual smooth boundary.

C2—20 to 60 inches; light brownish gray (10YR 6/2) extremely gravelly sand, dark brown (10YR 4/3) moist; single grain; loose; few very fine roots in the upper part; 55 percent pebbles and 15 percent cobbles; disseminated lime; strongly effervescent; moderately alkaline.

### Range in Characteristics

*Soil temperature:* 42 to 47 degrees F

*Moisture control section:* Between the depths of 12 and 35 inches; dry in all parts between  $\frac{4}{10}$  and  $\frac{5}{10}$  of the cumulative days per year when the soil temperature at a depth of 20 inches is 41 degrees F or higher

*Water table:* At the surface to 3.5 feet below the surface at some time during the months of April, May, June, or July

*Ap horizon:*

Hue—10YR or 2.5Y  
Value—5, 6, or 7 dry; 4 or 5 moist  
Chroma—2 or 3  
Clay content—5 to 15 percent  
Content of rock fragments—35 to 60 percent (0 to 10 percent stones and cobbles, 15 to 50 percent pebbles)  
Calcium carbonate equivalent—1 to 5 percent  
Reaction—pH 7.4 to 8.4

*C1 and C2 horizons:*

Hue—10YR or 2.5Y  
Value—5, 6, or 7 dry; 4 or 5 moist  
Chroma—2 or 3  
Texture—sand or loamy sand that consists of stratification of these and some finer sands  
Clay content—0 to 5 percent  
Content of rock fragments—55 to 80 percent (10 to 20 percent stones and cobbles, 45 to 70 percent pebbles)  
Calcium carbonate equivalent—5 to 10 percent  
Reaction—pH 7.4 to 8.4

## Roegulch Series

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, ridges, and side slopes of hills

*Parent material:* Slope alluvium and residuum derived from granite

*Slope range:* 8 to 60 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Lithic Haplustepts

### Typical Pedon

Roegulch cobbly sandy clay loam, in an area of Skyview, very bouldery-Rock outcrop-Roegulch, very bouldery, complex, 8 to 35 percent slopes; in a forested area, 2,100 feet south and 500 feet west of the northeast corner of sec. 28, T. 9 N., R. 2 W.

Oi—2 inches to 0; partially decomposed needles, twigs, and leaves.

A—0 to 4 inches; dark grayish brown (10YR 4/2) cobbly sandy clay loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and few fine roots; many very fine and fine pores and few medium pores; 20 percent cobbles and 10 percent granite pebbles; neutral (pH 7.0); clear smooth boundary.

Bw—4 to 16 inches; pale brown (10YR 6/3) very cobbly sandy clay loam, brown (10YR 5/3) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine, common fine and medium, and few coarse roots; many very fine and few fine pores; 10 percent stones, 20 percent cobbles, and 20 percent granite pebbles; slightly acid (pH 6.2); clear smooth boundary.

Cr—16 to 19 inches; light brownish gray (2.5Y 6/2), decomposed granite bedrock (grus) that crushes to very gravelly coarse sand.

R—19 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between a depth of 6 inches and the lithic contact

*Depth to Cr horizon:* 10 to 18 inches

*Depth to R layer:* 12 to 20 inches

*Percent of surface covered by stones/boulders:* 0.01 to 20 percent

*A horizon:*

Hue—10YR or 2.5Y  
Value—4 or 5 dry; 3 or 4 moist  
Chroma—2 or 3  
Texture—loam or sandy clay loam  
Clay content—10 to 25 percent  
Content of rock fragments—20 to 60 percent (10 to 20 percent cobbles and stones, 10 to 40 percent pebbles)  
Reaction—pH 6.1 to 7.3

*Bw horizon:*

Hue—10YR or 2.5Y  
Value—5 or 6 dry; 4 or 5 moist  
Chroma—2, 3, or 4  
Texture—coarse sandy loam, sandy loam, or sandy clay loam  
Clay content—10 to 25 percent  
Content of rock fragments—35 to 70 percent (0 to 10 percent stones, 15 to 25 percent cobbles, 20 to 35 percent pebbles)  
Reaction—pH 6.1 to 7.3

## Rothiemay Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderately slow (0.2 to 0.6 inch per hour)

*Landform:* Alluvial fans, knolls, and stream terraces

*Parent material:* Alluvium

*Slope range:* 2 to 8 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Aridic Calcicustolls

### Typical Pedon

Rothiemay very gravelly loam, 2 to 8 percent slopes, in cropland, 1,200 feet south and 2,600 feet east of the northwest corner of sec. 11, T. 9 N., R. 2 W.

Ap—0 to 6 inches; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; strong medium and coarse subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; many very fine roots; 5 percent rounded cobbles and 35 percent rounded pebbles; slightly alkaline (pH 7.6); clear smooth boundary.

Bk1—6 to 21 inches; white (10YR 8/2) loam, pale brown (10YR 6/3) moist; moderate medium and coarse prismatic structure parting to moderate medium and fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine pores; 10 percent rounded pebbles; disseminated lime, common fine and medium threads and masses of lime, common faint lime coatings on undersides of fragments; violently effervescent; moderately alkaline (pH 8.4); clear smooth boundary.

Bk2—21 to 32 inches; very pale brown (10YR 8/4) gravelly loam, light yellowish brown (10YR 6/4) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine pores; 5 percent rounded cobbles and 15 percent rounded pebbles; disseminated lime, common fine and medium threads and masses of lime, common distinct lime coatings on fragments; violently effervescent; moderately alkaline (pH 8.4); clear smooth boundary.

Bk3—32 to 60 inches; light yellowish brown (10YR 6/4) gravelly loam, brown (10YR 5/3) moist;

massive; soft, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine pores; 10 percent rounded cobbles and 20 percent rounded pebbles; disseminated lime, common fine and medium threads and masses of lime, common distinct lime casts on undersides of fragments; violently effervescent; moderately alkaline (pH 8.2).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 9 inches

*Depth to Bk horizon:* 6 to 7 inches

*Ap horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 2, 3, or 4 moist

Chroma—2 or 3

Clay content—15 to 27 percent

Content of rock fragments—10 to 45 percent (0 to 5 percent cobbles, 10 to 40 percent pebbles)

Calcium carbonate equivalent—5 to 10 percent

Reaction—pH 7.4 to 8.4

Note—calcareous when mixed to a depth of 7 inches

*Bk horizon:*

Hue—10YR or 2.5Y

Value—6, 7, or 8 dry; 5, 6, or 7 moist

Chroma—2, 3, or 4

Texture—clay loam or loam

Clay content—18 to 35 percent

Content of rock fragments—5 to 35 percent (0 to 10 percent cobbles, 5 to 20 percent pebbles)

Calcium carbonate equivalent—15 to 40 percent

Reaction—pH 7.9 to 9.0

## Roto Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, ridges, and side slopes of hills

*Parent material:* Slope alluvium and residuum derived from limestone

*Slope range:* 2 to 60 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Loamy-skeletal, carbonatic, frigid Aridic Calcustepts

### Typical Pedon

Roto very channery loam, in an area of Roto-Pensore-Crago complex, 35 to 60 percent slopes, stony, in rangeland, 900 feet south and 1,750 feet east of the northwest corner of sec. 36, T. 2 N., R. 1 W.

A—0 to 3 inches; dark grayish brown (10YR 4/2) very channery loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; 35 percent channers and 5 percent flagstones; disseminated lime, common faint lime coatings on undersides of fragments; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary.

Bk1—3 to 8 inches; pale brown (10YR 6/3) very channery loam, brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine pores; 45 percent channers and 5 percent flagstones; disseminated lime, common fine seams and masses of segregated white lime, many distinct white lime casts on undersides of fragments; violently effervescent; moderately alkaline (pH 8.2); gradual smooth boundary.

Bk2—8 to 18 inches; white (10YR 8/2) very channery loam, light gray (10YR 7/2) moist; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine pores; 45 percent channers and 10 percent flagstones; disseminated lime, common fine seams and masses of segregated white lime, continuous distinct white lime casts on undersides of fragments; violently effervescent; moderately alkaline (pH 8.4); gradual smooth boundary.

Bk3—18 to 30 inches; light gray (10YR 7/2) very channery loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine pores; 50 percent channers and 10 percent flagstones; disseminated lime, common fine seams and masses of segregated white lime, continuous distinct white lime casts on fragments; violently effervescent; moderately alkaline (pH 8.4); abrupt wavy boundary.

R—30 inches; light gray (10YR 7/1), hard limestone.

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 6 and 18 inches

*Depth to Bk horizon:* 2 to 5 inches

*Depth to bedrock:* 20 to 40 inches

*Percent of surface covered by stones/boulders:* 0 to 0.1 percent

*A horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 3 or 4 moist

Chroma—1, 2, or 3

Clay content—10 to 27 percent

Content of rock fragments—15 to 60 percent (0 to 10 percent cobbles and stones, 15 to 50 percent pebbles)

Calcium carbonate equivalent—10 to 25 percent

Reaction—pH 7.9 to 8.4

*Bk horizon:*

Hue—10YR or 2.5Y

Value—5, 6, 7, or 8 dry; 4, 5, 6, or 7 moist

Chroma—2, 3, or 4

Clay content—10 to 25 percent

Content of rock fragments—35 to 65 percent (5 to 10 percent cobbles, 30 to 55 percent pebbles)

Calcium carbonate equivalent—40 to 60 percent (including rock fragments less than 20 mm in diameter)

Reaction—pH 7.9 to 9.0

### Rubick Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Somewhat excessively drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Ridges and side slopes of mountains

*Parent material:* Slope alluvium derived from granite

*Slope range:* 35 to 60 percent

*Elevation range:* 5,500 to 8,000 feet

*Annual precipitation:* 15 to 30 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 30 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Ustic Eutrocrepts

### Typical Pedon

Rubick cobbly coarse sandy loam, in an area of Rubick, very stony-Rock outcrop complex, 35 to 60 percent slopes; in a forested area, 2,400 feet south and 2,000 feet west of the northeast corner of sec. 20, T. 7 N., R. 3 W.

Oi—2 inches to 0; forest litter of partially decomposed needles and twigs.

- E1—0 to 3 inches; light brownish gray (10YR 6/2) cobbly coarse sandy loam, brown (10YR 4/3) moist; moderate very fine granular structure; slightly hard, very friable, nonsticky and slightly plastic; many very fine and fine roots and few medium and coarse roots; 5 percent stones, 10 percent cobbles, and 10 percent pebbles; slightly acid (pH 6.4); abrupt wavy boundary.
- E2—3 to 8 inches; light brownish gray (10YR 6/2) very cobbly coarse sandy loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots and common medium and coarse roots; many very fine, fine, and medium pores; 5 percent stones, 20 percent cobbles, and 15 percent pebbles; neutral (pH 7.0); clear wavy boundary.
- Bw—8 to 27 inches; pale brown (10YR 6/3) very stony coarse sandy loam, brown (10YR 5/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots and common medium and coarse roots; many very fine, fine, and medium pores; 20 percent stones, 10 percent cobbles, and 20 percent pebbles; neutral (pH 7.2); gradual wavy boundary.
- BC—27 to 60 inches; light gray (10YR 7/2) extremely stony loamy coarse sand, pale brown (10YR 6/3) moist; single grain; loose, nonsticky and nonplastic; few fine, medium, and coarse roots; 30 percent stones, 15 percent cobbles, and 25 percent pebbles; neutral (pH 7.0).

### Range in Characteristics

- Soil temperature:* 36 to 42 degrees F  
*Moisture control section:* Between the depths of 8 and 24 inches  
*Percent of surface covered by stones:* 0.01 to 3.0 percent

#### *E horizon:*

- Hue—10YR or 2.5Y  
 Value—5 or 6 dry; 4 or 5 moist  
 Chroma—2 or 3  
 Texture—sandy loam or coarse sandy loam  
 Clay content—8 to 20 percent  
 Content of rock fragments—15 to 50 percent (5 to 25 percent cobbles and stones, 10 to 25 percent pebbles)  
 Reaction—pH 5.6 to 7.3

#### *Bw horizon:*

- Hue—10YR or 2.5Y  
 Value—5 or 6 dry; 4 or 5 moist  
 Chroma—2 or 3

- Texture—coarse sandy loam or sandy loam  
 Clay content—8 to 18 percent  
 Content of rock fragments—35 to 60 percent (20 to 35 percent cobbles and stones, 15 to 25 percent pebbles)  
 Reaction—pH 5.6 to 7.3

#### *BC horizon:*

- Hue—10YR or 2.5Y  
 Value—6 or 7 dry; 5 or 6 moist  
 Chroma—2 or 3  
 Texture—sandy loam, coarse sandy loam, loamy coarse sand, or loamy sand  
 Clay content—5 to 15 percent  
 Content of rock fragments—35 to 70 percent (25 to 45 percent cobbles and stones, 15 to 25 percent pebbles)  
 Reaction—pH 5.6 to 7.3

## Ryell Series

- Depth class:* Very deep (greater than 60 inches)  
*Drainage class:* Well drained  
*Permeability:* Moderate (0.6 inch to 2.0 inches per hour) above the 2C horizon and rapid (6.0 to 20.0 inches per hour) in the 2C horizon  
*Landform:* Flood plains, flood-plain steps, and drainageways  
*Parent material:* Recent alluvium derived from mixed rock sources  
*Slope range:* 0 to 2 percent  
*Elevation range:* 3,500 to 5,000 feet  
*Annual precipitation:* 10 to 14 inches  
*Annual air temperature:* 40 to 44 degrees F  
*Frost-free period:* 90 to 120 days

**Taxonomic classification:** Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, calcareous, frigid Aridic Ustifluvents

### Typical Pedon

Ryell loam, in an area of Ryell-Riverrun complex, 0 to 2 percent slopes, in rangeland, 700 feet south and 2,520 feet west of the northeast corner of sec. 4, T. 1 N., R. 3 W.

A—0 to 2 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; moderate very fine granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; 5 percent rounded pebbles; slightly effervescent; slightly alkaline (pH 7.4); clear smooth boundary.

C1—2 to 10 inches; brown (10YR 5/3) loam with thin strata of fine sandy loam and silt loam, brown

(10YR 4/3) moist; weak coarse prismatic structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots and few medium roots; common fine pores; 5 percent rounded pebbles; disseminated lime; slightly effervescent; slightly alkaline (pH 7.8); clear wavy boundary.

C2—10 to 28 inches; pale brown (10YR 6/3) sandy loam with thin strata of loam and silt loam, grayish brown (10YR 5/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine pores; 5 percent rounded pebbles; disseminated lime, common faint lime coatings on undersides of fragments; strongly effervescent; moderately alkaline (pH 8.3); gradual wavy boundary.

2C3—28 to 60 inches; very pale brown (10YR 7/3) very gravelly loamy sand with strata of sandy loam and loam, pale brown (10YR 6/3) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; 5 percent rounded cobbles and 40 percent rounded pebbles; disseminated lime, common faint lime coatings on fragments in the upper part; slightly effervescent; moderately alkaline (pH 8.2).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches

*Depth to 2C horizon:* 20 to 40 inches

*Depth to the water table:* Dominantly more than 60 inches; 42 to 60 inches for brief periods during spring and early summer

*A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 2 or 3 moist

Chroma—2 or 3

Texture—loam or sandy loam

Clay content—10 to 27 percent

Content of rock fragments—0 to 15 percent pebbles

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 6.6 to 8.4

*C horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—loam or sandy loam with thin strata of clay loam, silty clay loam, silt loam, fine sandy loam, or very fine sandy loam

Clay content—10 to 18 percent

Content of rock fragments—0 to 15 percent pebbles

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.4 to 8.4

*2C horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—loamy sand or sand with strata of sandy loam, fine sandy loam, loam, or very fine sandy loam

Clay content—0 to 10 percent

Content of rock fragments—35 to 75 percent (0 to 15 percent cobbles, 35 to 60 percent pebbles)

Calcium carbonate equivalent—0 to 10 percent

Reaction—pH 7.4 to 8.4

## Sappington Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, knolls, plains, and side slopes of hills

*Parent material:* Alluvium

*Slope range:* 0 to 15 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Coarse-loamy, mixed, superactive, frigid Calcic Argiustolls

### Typical Pedon

Sappington clay loam, in an area of Sappington-Amesha complex, 2 to 8 percent slopes, in cropland, 2,350 feet south and 1,300 feet east of the northwest corner of sec. 33, T. 3 N., R. 2 W.

Ap—0 to 4 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate very fine granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; 3 percent rounded pebbles; neutral (pH 7.0); abrupt smooth boundary.

Bt—4 to 8 inches; brown (10YR 5/3) clay loam, brown (10YR 3/3) moist; moderate medium prismatic structure; hard, friable, moderately sticky and moderately plastic; common very fine and fine roots; many very fine pores; continuous faint clay

films on faces of peds; 3 percent rounded pebbles; slightly effervescent; slightly alkaline (pH 7.8); clear smooth boundary.

**Bk1**—8 to 20 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine pores; 1 percent rounded pebbles; disseminated lime, common fine and medium threads and masses of lime, common faint lime coatings on undersides of fragments; strongly effervescent; moderately alkaline (pH 8.3); clear smooth boundary.

**Bk2**—20 to 28 inches; very pale brown (10YR 7/3) loam, pale brown (10YR 6/3) moist; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine pores; 1 percent rounded pebbles; disseminated lime, common fine and medium threads and masses of lime, many distinct lime coatings on fragments; violently effervescent; moderately alkaline (pH 8.3); gradual smooth boundary.

**Bk3**—28 to 60 inches; light yellowish brown (10YR 6/4) fine sandy loam, yellowish brown (10YR 5/4) moist; weak coarse angular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common fine and very fine roots; common very fine and fine pores; 5 percent rounded pebbles; disseminated lime, few fine masses of lime, common distinct lime coatings on fragments; violently effervescent; moderately alkaline (pH 8.4).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches

*Thickness of the mollic epipedon:* 7 to 9 inches

*Depth to Bk horizon:* 6 to 10 inches

*Percent of surface covered by stones:* 0 to 0.1 percent

*Ap horizon:*

Hue—2.5Y or 10YR

Value—4 or 5 dry

Chroma—2 or 3

Texture—loam or clay loam

Clay content—15 to 35 percent

Content of rock fragments—0 to 35 percent (0 to 10 percent cobbles, 0 to 25 percent pebbles)

Calcium carbonate equivalent—0 to 3 percent

Reaction—pH 6.6 to 7.8

*Bt horizon:*

Hue—2.5Y or 10YR

Value—4 or 5 dry; 3 or 4 moist

Chroma—3 or 4

Clay content—27 to 35 percent

Content of rock fragments—0 to 25 percent pebbles

Calcium carbonate equivalent—0 to 10 percent

Reaction—pH 6.6 to 7.8

*Bk horizon:*

Hue—2.5Y or 10YR

Value—5, 6, 7, or 8 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—loam or sandy loam

Clay content—10 to 27 percent

Content of rock fragments—0 to 25 percent pebbles

Calcium carbonate equivalent—5 to 40 percent

Reaction—pH 7.4 to 8.4

### Sawbuck Series

*Depth class:* Deep (40 to 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, escarpments, and side slopes of hills and mountains

*Parent material:* Colluvium and residuum derived mainly from granite

*Slope range:* 2 to 45 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Argiustolls

### Typical Pedon

Sawbuck gravelly sandy loam, in an area of Sawbuck-Catgulch, stony, complex, 8 to 45 percent slopes; in a forested area, 1,500 feet north and 1,600 feet west of the southeast corner of sec. 14, T. 7 N., R. 4 W.

**Oi**—1 inch to 0; forest litter of partially decomposed twigs and needles.

**A**—0 to 6 inches; very dark grayish brown (10YR 3/2) gravelly sandy loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; many very fine and fine roots; slightly hard, friable, slightly sticky and nonplastic; 20 percent pebbles; neutral (pH 6.6); clear smooth boundary.

**Bt1**—6 to 12 inches; brown (10YR 4/3) very gravelly sandy clay loam, dark brown (10YR 3/3) moist; moderate medium and fine subangular blocky

structure; hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots and few medium roots; many very fine pores; common distinct dark brown (10YR 3/3) (moist) clay films on faces of peds and bridging sand grains; 5 percent angular cobbles and 45 percent angular pebbles; neutral (pH 6.6); clear smooth boundary.

**Bt2**—12 to 17 inches; light yellowish brown (10YR 6/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium and fine subangular blocky structure; hard, friable, moderately sticky and moderately plastic; many very fine and fine roots and common medium roots; common fine and very fine pores; many distinct dark brown (10YR 3/3) (moist) clay films on faces of peds and lining pores; 10 percent angular cobbles and 30 percent angular pebbles; neutral (pH 6.8); clear wavy boundary.

**Bt3**—17 to 23 inches; light yellowish brown (10YR 6/4) very gravelly sandy clay loam, yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium roots; many very fine pores; common distinct clay films on faces of peds; 5 percent angular cobbles and 40 percent angular pebbles; neutral (pH 6.8); gradual wavy boundary.

**BC**—23 to 46 inches; very pale brown (10YR 7/4) extremely gravelly sandy clay loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots and few medium roots; many very fine pores; 20 percent angular cobbles and 50 percent angular pebbles; moderately acid (pH 5.6); gradual wavy boundary.

**Cr**—46 to 60 inches; very pale brown (10YR 7/4), decomposing granite bedrock that crushes to extremely gravelly loamy coarse sand.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 10 to 15 inches

*Depth to Bt horizon:* 5 to 16 inches

*Depth to Cr horizon:* 40 to 60 inches

*Percent of surface covered by stones/boulders:* 0 to 3 percent

#### *A horizon:*

Value—3, 4, or 5 dry; 2 or 3 moist

Chroma—1 or 2

Texture—loam, sandy clay loam, or sandy loam

Clay content—10 to 30 percent

Content of rock fragments—15 to 30 percent (0 to 5 percent stones, 0 to 5 percent angular cobbles, 15 to 20 percent angular pebbles)

Reaction—pH 6.1 to 7.3

#### *Bt1 horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 3 or 4 moist

Chroma—2 or 3

Texture—sandy clay loam, clay loam, or loam

Clay content—25 to 35 percent

Content of rock fragments—15 to 55 percent (5 to 10 percent angular cobbles, 10 to 45 percent angular pebbles)

Reaction—pH 6.1 to 7.3

#### *Bt2 and Bt3 horizons:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—clay loam, loam, or sandy clay loam

Clay content—25 to 35 percent

Content of rock fragments—35 to 60 percent (5 to 10 percent angular cobbles, 30 to 50 percent angular pebbles)

Reaction—pH 6.1 to 7.3

#### *BC horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—sandy clay loam, sandy loam, or loam

Clay content—15 to 25 percent

Content of rock fragments—15 to 70 percent (5 to 20 percent angular cobbles, 10 to 50 percent angular pebbles)

Reaction—pH 5.6 to 6.5

## Sawicki Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, escarpments, and side slopes of hills and mountains

*Parent material:* Colluvium and slope alluvium derived from hard, fine grained igneous rock

*Slope range:* 4 to 70 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 38 to 42 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Argiustolls

### Typical Pedon

Sawicki cobbly loam, in an area of Blaincreek, very stony-Sawicki, very stony-Tolbert, very bouldery, complex, 35 to 70 percent slopes, in rangeland, 200 feet south and 2,650 feet west of the northeast corner of sec. 9, T. 3 N., R. 3 W.

A—0 to 8 inches; dark brown (10YR 3/3) cobbly loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; 15 percent angular cobbles and 15 percent angular pebbles; slightly acid (pH 6.4); clear wavy boundary.

Bt1—8 to 14 inches; dark grayish brown (10YR 4/2) very cobbly clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, firm, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; common distinct brown (10YR 4/3) clay films on faces of peds; 25 percent angular cobbles and 15 percent angular pebbles; neutral (pH 6.6); gradual wavy boundary.

Bt2—14 to 25 inches; brown (10YR 5/3) very cobbly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots and common medium roots; many very fine and fine pores; common faint brown (10YR 4/3) clay films on faces of peds; 30 percent angular cobbles and 25 percent angular pebbles; neutral (pH 6.6); gradual irregular boundary.

BC—25 to 51 inches; light brownish gray (10YR 6/2) very cobbly loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots and common medium roots; many very fine and fine pores; 40 percent angular cobbles and 20 percent angular pebbles; neutral (pH 7.2); gradual irregular boundary.

C—51 to 60 inches; light brownish gray (10YR 6/2) extremely cobbly loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; many very fine roots; many very fine and fine pores; 55 percent angular cobbles and 25 percent angular pebbles; neutral (pH 7.2).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 8 to 16 inches

*Depth to Bt horizon:* 7 to 13 inches

*Percent of surface covered by stones/boulders:* 0 to 3 percent

#### *A horizon:*

Hue—10YR or 2.5Y

Value—3 or 4 dry; 2 or 3 moist

Chroma—2 or 3

Texture—loam, sandy clay loam, or sandy loam

Clay content—10 to 30 percent

Content of rock fragments—15 to 50 percent (0 to 25 percent stones and cobbles, 15 to 40 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *Bt1 horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 3 or 4 moist

Chroma—2 or 3

Texture—loam, sandy clay loam, or clay loam

Clay content—22 to 35 percent

Content of rock fragments—35 to 60 percent (15 to 35 percent stones and cobbles, 15 to 40 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *Bt2 horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—loam, sandy loam, or sandy clay loam

Clay content—18 to 27 percent

Content of rock fragments—35 to 60 percent (15 to 45 percent stones and cobbles, 20 to 40 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *BC horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—coarse sandy loam, loam, sandy loam, or sandy clay loam

Clay content—18 to 27 percent

Content of rock fragments—35 to 60 percent (15 to 45 percent stones and cobbles, 20 to 40 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *C horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—loam, coarse sandy loam, sandy clay loam, or sandy loam  
 Clay content—15 to 22 percent  
 Content of rock fragments—35 to 70 percent (15 to 55 percent stones and cobbles, 20 to 40 percent pebbles)  
 Reaction—pH 6.1 to 7.3

## Sebud Series

*Depth class:* Very deep (greater than 60 inches)  
*Drainage class:* Well drained  
*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)  
*Landform:* Alluvial fans and side slopes of mountains  
*Parent material:* Slope alluvium and colluvium derived mainly from igneous and metamorphic rock  
*Slope range:* 2 to 60 percent  
*Elevation range:* 5,500 to 8,000 feet  
*Annual precipitation:* 15 to 30 inches  
*Annual air temperature:* 34 to 44 degrees F  
*Frost-free period:* 30 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Ustic Haplocryolls

### Typical Pedon

Sebud very gravelly loam, in an area of Sebud, stony-Surdal, stony-Arrowpeak, very stony, complex, 35 to 60 percent slopes, in rangeland, 300 feet west and 800 feet north of the southeast corner of sec. 13, T. 3 N., R. 4 W.

A—0 to 10 inches; very dark grayish brown (10YR 3/2) very gravelly loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; 10 percent rounded cobbles and 25 percent rounded pebbles; slightly acid (pH 6.4); clear wavy boundary.

Bw1—10 to 23 inches; yellowish brown (10YR 5/4) very gravelly loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; many very fine and fine roots and few medium roots; many very fine and fine pores; 10 percent rounded cobbles and 30 percent rounded pebbles; neutral (pH 6.6); clear wavy boundary.

Bw2—23 to 32 inches; brown (10YR 5/3) very gravelly loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium and coarse roots; many very fine and fine pores; 10 percent rounded cobbles and 35

percent rounded pebbles; neutral (pH 6.8); gradual wavy boundary.

BC—32 to 44 inches; brown (10YR 5/3) very gravelly loam, brown (10YR 4/3) moist; moderate medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common very fine and fine roots and few medium and coarse roots; many very fine and fine pores; 20 percent rounded cobbles and 40 percent rounded pebbles; neutral (pH 7.2); gradual irregular boundary.

C—44 to 60 inches; brown (10YR 5/3) extremely gravelly loam, grayish brown (10YR 5/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; few very fine and fine pores; 10 percent rounded cobbles and 60 percent rounded pebbles; neutral (pH 7.2).

### Range in Characteristics

*Soil temperature:* 36 to 42 degrees F  
*Moisture control section:* Between the depths of 6 and 18 inches  
*Thickness of the mollic epipedon:* 10 to 16 inches  
*Percent of surface covered by stones/boulders:* 0 to 3 percent

#### A horizon:

Hue—2.5Y or 10YR  
 Value—3 or 4 dry; 2 or 3 moist  
 Chroma—1, 2, or 3  
 Clay content—15 to 27 percent  
 Content of rock fragments—10 to 60 percent (5 to 45 percent cobbles, 5 to 25 percent pebbles)  
 Reaction—pH 6.1 to 7.8

#### Bw horizon:

Hue—2.5Y or 10YR  
 Value—5, 6, or 7 dry; 3, 4, or 5 moist  
 Chroma—2, 3, or 4  
 Texture—loam or sandy clay loam  
 Clay content—12 to 27 percent  
 Content of rock fragments—35 to 60 percent (10 to 20 percent cobbles, 25 to 40 percent pebbles)  
 Reaction—pH 6.6 to 7.8

#### BC horizon:

Hue—2.5Y or 10YR  
 Value—5, 6, or 7 dry; 3, 4, or 5 moist  
 Chroma—2, 3, or 4  
 Texture—loam or sandy clay loam  
 Clay content—12 to 27 percent  
 Content of rock fragments—35 to 60 percent (10 to 20 percent cobbles, 25 to 40 percent pebbles)  
 Reaction—pH 6.6 to 7.8

*C horizon:*

Hue—2.5Y or 10YR  
 Value—5, 6, or 7 dry; 3, 4, or 5 moist  
 Chroma—2, 3, or 4  
 Texture—loam or sandy clay loam  
 Clay content—12 to 27 percent  
 Content of rock fragments—35 to 85 percent (10 to 25 percent cobbles, 25 to 60 percent pebbles)  
 Reaction—pH 6.6 to 7.8

**Shaboom Series**

*Depth class:* Shallow (10 to 20 inches)  
*Drainage class:* Well drained  
*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)  
*Landform:* Escarpments, ridges, and side slopes of hills  
*Parent material:* Slope alluvium and residuum derived from granite  
*Slope range:* 4 to 75 percent  
*Elevation range:* 4,400 to 6,000 feet  
*Annual precipitation:* 15 to 19 inches  
*Annual air temperature:* 38 to 42 degrees F  
*Frost-free period:* 80 to 105 days  
**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Lithic Haplustepts

**Typical Pedon**

Shaboom gravelly coarse sandy loam, in an area of Lumpgulch, bouldery-Hoyt-Shaboom, very bouldery, complex, 4 to 15 percent slopes; in a forested area, 3,350 feet north and 1,650 feet east of the southwest corner of sec. 32, T. 9 N., R. 2 W.

Oi—1 inch to 0; forest litter of partially decomposed needles, twigs, and leaves.  
 A—0 to 3 inches; brown (10YR 5/3) gravelly coarse sandy loam, dark brown (10YR 3/3) moist; weak fine and very fine granular structure; soft, very friable, slightly sticky and nonplastic; many very fine, few fine, and few medium roots; 5 percent cobbles and 20 percent pebbles; neutral (pH 7.1); clear wavy boundary.  
 Bw—3 to 12 inches; very pale brown (10YR 7/4) very gravelly coarse sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure parting to weak fine and very fine granular; soft, very friable, slightly sticky and nonplastic; many very fine roots and few fine and medium roots; many very fine tubular pores; 15 percent cobbles and 35 percent pebbles; neutral (pH 6.8); clear wavy boundary.

R—12 inches; hard granite bedrock.

**Range in Characteristics**

*Soil temperature:* 38 to 42 degrees F  
*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the lithic contact (if it occurs at a depth of less than 12 inches)  
*Depth to bedrock:* 10 to 20 inches  
*Percent of surface covered by boulders:* 0.01 to 15 percent

*A horizon:*

Hue—10YR or 2.5Y  
 Value—4, 5, or 6 dry; 3, 4, or 5 moist  
 Chroma—2 or 3  
 Texture—coarse sandy loam, sandy loam, sandy clay loam, or loam  
 Clay content—12 to 25 percent  
 Content of rock fragments—10 to 35 percent (0 to 15 percent cobbles, 10 to 20 percent pebbles)  
 Reaction—pH 6.1 to 7.3

*Bw horizon:*

Hue—10YR or 2.5Y  
 Value—5, 6, or 7 dry; 4 or 5 moist  
 Chroma—2, 3, or 4  
 Texture—coarse sandy loam, sandy loam, or sandy clay loam  
 Clay content—18 to 25 percent  
 Content of rock fragments—35 to 60 percent (5 to 15 percent cobbles, 30 to 45 percent pebbles)  
 Reaction—pH 5.6 to 7.3

**Shawmut Series**

*Depth class:* Very deep (greater than 60 inches)  
*Drainage class:* Well drained  
*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)  
*Landform:* Alluvial fans, escarpments, and side slopes of hills  
*Parent material:* Slope alluvium and colluvium derived from hard, fine grained igneous rock  
*Slope range:* 2 to 45 percent  
*Elevation range:* 4,400 to 6,000 feet  
*Annual precipitation:* 15 to 19 inches  
*Annual air temperature:* 38 to 42 degrees F  
*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Argiustolls

**Typical Pedon**

Shawmut very gravelly loam, in an area of

Martinsdale-Shawmut, stony-Martinsdale, bouldery, complex, 4 to 25 percent slopes, warm, in rangeland, 1,000 feet south and 1,600 feet east of the northwest corner of sec. 16, T. 9 N., R. 2 W.

A1—0 to 3 inches; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; 10 percent rounded cobbles and 30 percent rounded pebbles; slightly acid (pH 6.2); clear smooth boundary.

A2—3 to 7 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium roots; many very fine and fine pores; 10 percent rounded cobbles and 15 percent rounded pebbles; slightly acid (pH 6.4); clear smooth boundary.

Bt1—7 to 14 inches; brown (10YR 5/3) very cobbly clay loam, brown (10YR 4/3) moist; strong medium subangular blocky structure; hard, friable, moderately sticky and moderately plastic; many very fine and fine roots and few medium and coarse roots; many very fine and fine pores; common distinct brown (10YR 4/3) clay films on faces of peds and bridging sand grains; 20 percent rounded cobbles and 20 percent rounded pebbles; neutral (pH 6.7); clear wavy boundary.

Bt2—14 to 19 inches; pale brown (10YR 6/3) very cobbly clay loam, brown (10YR 4/3) moist; strong medium subangular blocky structure; hard, friable, moderately sticky and moderately plastic; many very fine and fine roots and few medium and coarse roots; many very fine and fine pores; common distinct brown (10YR 4/3) clay films on faces of peds and bridging sand grains; 20 percent rounded cobbles and 20 percent rounded pebbles; neutral (pH 6.8); clear wavy boundary.

Bk1—19 to 32 inches; light gray (10YR 7/2) very gravelly loam, pale brown (10YR 6/3) moist; moderate coarse subangular blocky structure; hard, friable, moderately sticky and moderately plastic; many very fine and fine roots and common medium and coarse roots; many very fine and fine pores; 15 percent rounded cobbles and 30 percent rounded pebbles; disseminated lime, common fine and medium threads and masses of lime, common distinct lime coatings on undersides of fragments; violently effervescent; moderately alkaline (pH 8.3); clear smooth boundary.

Bk2—32 to 60 inches; very pale brown (10YR 8/3)

very gravelly loam, light gray (10YR 7/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common fine and very fine pores; 15 percent rounded cobbles and 35 percent rounded pebbles; disseminated lime, common fine and medium threads and masses of lime, many distinct lime casts on fragments; violently effervescent; moderately alkaline (pH 8.4).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 13 inches

*Depth to Bt horizon:* 3 to 11 inches

*Depth to Bk horizon:* 11 to 24 inches

*Percent of surface covered by stones/boulders:* 0 to 3 percent

#### *A horizon:*

Hue—10YR or 2.5Y

Value—3, 4, or 5 dry; 2 or 3 moist

Chroma—2 or 3

Texture—loam or sandy clay loam

Clay content—15 to 27 percent

Content of rock fragments—15 to 50 percent (0 to 25 percent stones and cobbles, 15 to 40 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *Bt horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 3 or 4 moist

Chroma—2 or 3

Texture—sandy clay loam or clay loam

Clay content—25 to 35 percent

Content of rock fragments—35 to 60 percent (15 to 35 percent stones and cobbles, 15 to 40 percent pebbles)

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 6.6 to 7.8

#### *Bk horizon:*

Hue—10YR or 2.5Y

Value—6, 7, or 8 dry; 4, 5, 6, or 7 moist

Chroma—2, 3, or 4

Texture—loam, sandy loam, or sandy clay loam

Clay content—10 to 25 percent

Content of rock fragments—35 to 80 percent (15 to 45 percent stones and cobbles, 20 to 40 percent pebbles)

Calcium carbonate equivalent—10 to 30 percent

Reaction—pH 7.9 to 9.0

## Shoddy Series

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Well drained

*Permeability:* Slow (0.06 to 0.2 inch per hour)

*Landform:* Hills, knolls, and ridges

*Parent material:* Slope alluvium and residuum derived from semiconsolidated shale

*Slope range:* 2 to 45 percent

*Elevation range:* 4,000 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Clayey, mixed, superactive, frigid, shallow Aridic Haplustepts

### Typical Pedon

Shoddy silty clay loam, in an area of Shoddy-Cabbart-Kobarter complex, 4 to 25 percent slopes, in rangeland, 200 feet north and 950 feet west of the southeast corner of sec. 5, T. 1 N., R. 5 W.

A—0 to 1 inch; pale brown (10YR 6/3) silty clay loam, grayish brown (2.5Y 5/2) moist; strong very fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; 5 percent rounded pebbles; disseminated lime; slightly effervescent; slightly alkaline (pH 7.6); clear smooth boundary.

Bw—1 to 5 inches; pale brown (10YR 6/3) silty clay loam, dark grayish brown (10YR 4/2) moist; strong medium prismatic structure parting to moderate medium subangular blocky; hard, friable, moderately sticky and moderately plastic; many very fine and fine roots; many very fine and fine pores; disseminated lime; strongly effervescent; moderately alkaline (pH 8.2); clear wavy boundary.

Bk1—5 to 10 inches; pale brown (10YR 6/3) silty clay loam, olive gray (5Y 5/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, friable, moderately sticky and moderately plastic; many very fine and fine roots; common fine and many very fine pores; 25 percent soft angular shale fragments; disseminated lime, few fine masses and threads of lime; strongly effervescent; moderately alkaline (pH 8.2); clear wavy boundary.

Bk2—10 to 16 inches; light gray (2.5Y 7/2) silty clay loam, grayish brown (2.5Y 5/2) moist; moderate fine and medium angular blocky structure; hard, friable, moderately sticky and moderately plastic; common very fine and fine roots between shale fragments; common very fine pores; 60 percent

soft angular shale fragments; disseminated lime, many faint lime coatings on undersides of shale fragments; strongly effervescent; moderately alkaline (pH 8.4); clear wavy boundary.

Cr1—16 to 38 inches; light gray (10YR 7/2), semiconsolidated shale that crushes to silty clay loam.

Cr2—38 to 60 inches; light gray (2.5Y 7/2), semiconsolidated shale that crushes to silt loam.

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the paralithic contact (if it occurs at a depth of less than 12 inches)

*Depth to Bk horizon:* 3 to 7 inches

*Depth to Cr horizon:* 10 to 20 inches

*A horizon:*

Hue—7.5YR, 10YR, or 2.5Y

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2 or 3

Clay content—27 to 40 percent

Content of rock fragments—0 to 15 percent pebbles (from mixed rock sources)

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 7.4 to 9.0

*Bw horizon:*

Hue—7.5YR, 10YR, or 2.5Y

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2 or 3

Texture—silty clay loam, silty clay, or clay loam

Clay content—27 to 45 percent

Content of rock fragments—0 to 15 percent pebbles (from mixed rock sources)

Calcium carbonate equivalent—0 to 10 percent

Reaction—pH 7.4 to 9.0

*Bk horizon:*

Hue—7.5YR, 10YR, 5Y, or 2.5Y

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—silty clay, silty clay loam, or clay loam

Clay content—35 to 50 percent

Content of rock fragments—15 to 60 percent soft angular shale fragments

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.4 to 9.0

## Sieben Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Stream terraces, alluvial fans, and side slopes of hills

*Parent material:* Alluvium derived from mixed rock sources

*Slope range:* 1 to 60 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Calcic Argiustolls

### Typical Pedon

Sieben gravelly sandy loam, in an area of Sieben complex, 2 to 8 percent slopes, 550 feet south and 2,300 feet east of the northwest corner of sec. 9, T. 3 N., R. 4 W.

A—0 to 6 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; moderate medium granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; 5 percent rounded cobbles and 20 percent rounded pebbles; neutral (pH 7.2); clear smooth boundary.

Bt1—6 to 11 inches; dark yellowish brown (10YR 4/4) very gravelly sandy clay loam, dark yellowish brown (10YR 3/4) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium roots; many very fine and fine pores; common faint dark grayish brown (10YR 4/2) (moist) clay films on faces of peds and bridging sand grains; 5 percent rounded cobbles and 30 percent rounded pebbles; slightly alkaline (pH 7.4); clear smooth boundary.

Bt2—11 to 15 inches; brown (10YR 5/3) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots and few medium roots; many very fine and fine pores; few faint dark grayish brown (10YR 4/2) (moist) clay films on faces of peds and bridging sand grains; 5 percent rounded cobbles and 35 percent rounded pebbles; slightly alkaline (pH 7.6); clear wavy boundary.

Bk1—15 to 24 inches; brown (10YR 5/3) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; weak coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots and few

medium roots; many very fine and fine pores; 5 percent rounded cobbles and 45 percent rounded pebbles; disseminated lime, common fine and medium threads and masses of lime, common faint lime coatings on undersides of fragments; violently effervescent; moderately alkaline (pH 7.9); gradual wavy boundary.

Bk2—24 to 60 inches; pale brown (10YR 6/3) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; common fine and very fine pores; 10 percent rounded cobbles and 45 percent rounded pebbles; disseminated lime, common fine and medium threads and masses of lime, many distinct lime casts on undersides of fragments; violently effervescent; moderately alkaline (pH 8.4).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 10 inches

*Depth to Bk horizon:* 12 to 18 inches

*Percent of surface covered by stones/boulders:* 0 to 20 percent

*A horizon:*

Hue—10YR or 2.5Y

Chroma—2 or 3

Texture—loam or sandy loam

Clay content—10 to 27 percent

Content of rock fragments—10 to 60 percent (0 to 30 percent cobbles and stones, 10 to 30 percent pebbles)

Calcium carbonate equivalent—0 to 3 percent

Reaction—pH 6.6 to 7.3

*Bt horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 3 or 4 moist

Chroma—3 or 4

Texture—sandy loam, sandy clay loam, loam, or clay loam

Clay content—20 to 35 percent

Content of rock fragments—35 to 60 percent (0 to 5 percent cobbles and stones, 35 to 50 percent pebbles)

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 6.6 to 7.8

*Bk horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—sandy loam, loam, or coarse sandy loam  
 Clay content—10 to 27 percent  
 Content of rock fragments—50 to 80 percent (5 to 20 percent cobbles and stones, 45 to 60 percent pebbles)  
 Calcium carbonate equivalent—10 to 30 percent  
 Reaction—pH 7.9 to 9.0

## Sieberell Series

*Depth class:* Very deep (greater than 60 inches)  
*Drainage class:* Well drained  
*Permeability:* Moderate (0.6 inch to 2.0 inches per hour) above the 2C horizon and rapid (6.0 to 20.0 inches per hour) in the 2C horizon  
*Landform:* Stream terraces, alluvial fans, and side slopes of hills  
*Parent material:* Slope alluvium derived from mixed rock sources  
*Slope range:* 1 to 15 percent  
*Elevation range:* 3,800 to 5,000 feet  
*Annual precipitation:* 10 to 14 inches  
*Annual air temperature:* 40 to 44 degrees F  
*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Loamy-skeletal over sandy or sandy-skeletal, mixed, superactive, frigid Aridic Argiustolls

### Typical Pedon

Sieberell very gravelly loam, in an area of Sieberell-Sieben-Beaverell complex, 4 to 15 percent slopes, stony, in rangeland, 1,600 feet south and 100 feet east of the northwest corner of sec. 9, T. 4 N., R. 3 W.

A—0 to 6 inches; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine subangular blocky structure; soft, very friable, moderately sticky and slightly plastic; many very fine and few fine roots; many very fine and fine pores and few medium pores; 10 percent rounded cobbles and 30 percent rounded pebbles; neutral (pH 6.6); clear smooth boundary.

Bt—6 to 11 inches; light olive brown (2.5Y 5/4) very gravelly clay loam, olive brown (2.5Y 4/4) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, moderately sticky and moderately plastic; many very fine and few fine roots; many very fine and few fine pores; many distinct olive brown (2.5Y 4/4) clay films on faces of peds and bridging sand grains; 10 percent rounded cobbles

and 30 percent rounded pebbles; neutral (pH 6.8); clear wavy boundary.

Bk—11 to 30 inches; pale yellow (2.5Y 7/4) extremely cobbly sandy clay loam, light yellowish brown (2.5Y 6/4) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; common very fine pores; 30 percent rounded cobbles and 45 percent rounded pebbles; disseminated lime, common faint lime coatings on tops and sides of fragments, common distinct lime casts on undersides of fragments; strongly effervescent; moderately alkaline (pH 8.2); clear smooth boundary.

2C—30 to 60 inches; light yellowish brown (2.5Y 6/4) extremely cobbly loamy sand, light olive brown (2.5Y 5/4) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; 10 percent stones, 30 percent rounded cobbles, and 35 percent rounded pebbles; common prominent lime casts on undersides of fragments; strongly effervescent; moderately alkaline (pH 8.0).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 9 inches

*Depth to Bt horizon:* 5 to 8 inches

*Depth to Bk horizon:* 10 to 15 inches

*Depth to 2C horizon:* 20 to 40 inches

*Percent of surface covered by stones/boulders:* 0.01 to 3.0 percent

*A horizon:*

Hue—10YR or 2.5Y

Chroma—2 or 3

Clay content—18 to 27 percent

Content of rock fragments—35 to 50 percent (5 to 20 percent cobbles and stones, 20 to 30 percent pebbles)

Reaction—pH 6.6 to 7.3

*Bt horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 3 or 4 moist

Chroma—3 or 4

Texture—sandy clay loam, loam, or clay loam

Clay content—25 to 35 percent

Content of rock fragments—35 to 60 percent (10 to 20 percent cobbles, 25 to 40 percent pebbles)

Reaction—pH 6.6 to 7.8

*Bk horizon:*

Hue—10YR or 2.5Y  
 Value—6, 7, or 8 dry; 5, 6, or 7 moist  
 Chroma—2, 3, or 4  
 Texture—sandy loam, sandy clay loam, or loam  
 Clay content—15 to 25 percent  
 Content of rock fragments—45 to 75 percent (20 to 30 percent cobbles, 25 to 45 percent pebbles)  
 Calcium carbonate equivalent—3 to 15 percent  
 Reaction—pH 7.9 to 8.4

*2C horizon:*

Hue—10YR or 2.5Y  
 Value—5 or 6 dry; 4 or 5 moist  
 Chroma—3 or 4  
 Texture—coarse sand, loamy coarse sand, or loamy sand  
 Clay content—0 to 10 percent  
 Content of rock fragments—50 to 80 percent (0 to 10 percent stones, 20 to 30 percent cobbles, 30 to 40 percent pebbles)  
 Calcium carbonate equivalent—0 to 5 percent  
 Reaction—pH 7.4 to 8.4

**Sigbird Series**

*Depth class:* Shallow (10 to 20 inches)  
*Drainage class:* Somewhat excessively drained  
*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)  
*Landform:* Escarpments, ridges, and side slopes of mountains  
*Parent material:* Slope alluvium and residuum derived from hard shale or argillite  
*Slope range:* 25 to 70 percent  
*Elevation range:* 5,500 to 7,000 feet  
*Annual precipitation:* 15 to 24 inches  
*Annual air temperature:* 36 to 40 degrees F  
*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Lithic Eutrocrepts

**Typical Pedon**

Sigbird very channery loam, in an area of Sigbird, very bouldery-Sigbird, stony-Rock outcrop complex, 25 to 70 percent slopes; in a forested area, 700 feet south and 350 feet west of the northeast corner of sec. 12, T. 5 N., R. 2 W.

A—0 to 5 inches; brown (10YR 5/3) very channery loam, dark brown (10YR 3/3) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine

and very fine roots; 10 percent flagstones and 50 percent channers; neutral (pH 7.2); clear wavy boundary.

Bw—5 to 14 inches; pale brown (10YR 6/3) extremely channery loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common very fine and fine roots; common fine and very fine pores; 15 percent flagstones and 60 percent channers; slightly alkaline (pH 7.4); clear smooth boundary.

R—14 inches; gray (10YR 5/1), fractured, hard shale.

**Range in Characteristics**

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the lithic contact (if it occurs at a depth of less than 12 inches)

*Depth to bedrock:* 10 to 20 inches

*Percent of surface covered by stones/boulders:* 0.01 to 3.0 percent

*A horizon:*

Hue—10YR or 2.5Y  
 Value—5 or 6 dry; 3 or 4 moist  
 Chroma—2 or 3  
 Clay content—18 to 27 percent  
 Content of rock fragments—25 to 60 percent (0 to 10 percent flagstones, 25 to 60 percent channers)  
 Reaction—pH 6.1 to 7.3

*Bw horizon:*

Hue—10YR, 2.5Y, or 5Y  
 Value—5, 6, or 7  
 Chroma—2 or 3  
 Texture—loam or sandy loam  
 Clay content—15 to 27 percent  
 Content of rock fragments—35 to 80 percent (0 to 20 percent flagstones, 35 to 60 percent channers)  
 Reaction—pH 6.6 to 7.8

**Silverchief Family**

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderately slow (0.2 to 0.6 inch per hour)

*Landform:* Alluvial fans and side slopes of hills and mountains

*Parent material:* Slope alluvium derived from mixed rock sources

*Slope range:* 8 to 35 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 90 to 105 days

**Taxonomic classification:** Fine, mixed, superactive, frigid Calcic Haplustalfs

### Typical Pedon

Silverchief very cobbly clay loam, 8 to 35 percent slopes, bouldery, in a forested area, 2,500 feet west and 1,900 feet north of the southeast corner of sec. 3, T. 9 N., R. 3 W.

Oi—1 inch to 0; organic mat of needles, leaves, and twigs.

A—0 to 4 inches; dark gray (10YR 4/1) very cobbly clay loam, very dark gray (10YR 3/1) moist; strong medium subangular blocky structure; hard, firm, moderately sticky and moderately plastic; many very fine and fine roots and few medium and coarse roots; many very fine and fine pores; 20 percent cobbles and 20 percent pebbles; slightly acid (pH 6.2); clear smooth boundary.

Bt—4 to 11 inches; brown (10YR 5/3) clay, brown (10YR 4/3) moist; strong medium prismatic structure parting to strong medium subangular blocky; hard, firm, moderately sticky and moderately plastic; many very fine and fine roots and few medium and coarse roots; many very fine and fine pores; common distinct brown (10YR 4/3 moist) clay films on faces of peds; 10 percent granite pebbles; neutral (pH 6.6); clear wavy boundary.

Btk—11 to 14 inches; pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, moderately sticky and slightly plastic; many very fine and fine roots and common medium and coarse roots; many very fine and fine pores; few faint brown (10YR 4/3) (moist) clay films on faces of peds; 5 percent granite pebbles; disseminated lime, common fine and medium threads and masses of lime, common faint lime coatings on undersides of fragments; strongly effervescent; moderately alkaline (pH 8.0); clear wavy boundary.

2C1—14 to 25 inches; pale yellow (2.5Y 7/4) very stony sandy loam, light brownish gray (2.5Y 6/2) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots and few medium and coarse roots; many very fine and fine pores; 20 percent stones, 15 percent

cobbles, and 10 percent pebbles; disseminated lime; strongly effervescent; moderately alkaline (pH 8.2); gradual wavy boundary.

2C2—25 to 60 inches; pale brown (10YR 6/3) very stony sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine pores; 20 percent stones, 20 percent cobbles, and 15 percent pebbles; disseminated lime; slightly effervescent; slightly alkaline (pH 7.8).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to calcic horizon:* 14 to 24 inches

*Percent of surface covered by boulders:* 0.01 to 0.1 percent

*A horizon:*

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—1, 2, 3, or 4

Clay content—35 to 40 percent

Content of rock fragments—35 to 60 percent (20 to 30 percent cobbles, 15 to 30 percent pebbles)

Reaction—pH 6.1 to 7.3

*Bt horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—3, 4, or 6

Texture—clay or clay loam

Clay content—35 to 50 percent

Content of rock fragments—5 to 35 percent (0 to 15 percent cobbles, 5 to 20 percent pebbles)

Reaction—pH 6.6 to 7.8

*Btk horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—3 or 4

Texture—clay, clay loam, or sandy clay loam

Clay content—20 to 45 percent

Content of rock fragments—5 to 50 percent (0 to 15 percent cobbles, 5 to 35 percent pebbles)

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 7.4 to 8.4

*2C horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—sandy loam or coarse sandy loam

Clay content—10 to 20 percent

Content of rock fragments—35 to 70 percent (15 to 45 percent cobbles and stones, 10 to 35 percent pebbles)

Calcium carbonate equivalent—3 to 35 percent  
Reaction—pH 6.6 to 8.4

## Sixbeacon Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour) above the 2Bk horizon and rapid (6.0 to 20.0 inches per hour) in the 2Bk horizon

*Landform:* Stream terraces, alluvial fans, and valley floors

*Parent material:* Alluvium derived from mixed rock sources

*Slope range:* 1 to 15 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Aridic Haplustolls

### Typical Pedon

Sixbeacon loam, 2 to 8 percent slopes, in rangeland, 250 feet south and 900 feet east of the northwest corner of sec. 27, T. 1 N., R. 1 W.

Ap—0 to 4 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; 5 percent rounded pebbles; slightly alkaline (pH 7.8); abrupt smooth boundary.

Bw—4 to 9 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; strong coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; many fine and very fine pores; 10 percent rounded pebbles; slightly alkaline (pH 7.8); clear wavy boundary.

Bk1—9 to 12 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; moderate medium prismatic structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots and few medium roots; many very fine and fine pores; 10 percent rounded pebbles; disseminated lime, common fine and medium threads and masses of lime, common faint lime coatings on undersides of fragments; strongly

effervescent; moderately alkaline (pH 8.0); clear wavy boundary.

2Bk2—12 to 32 inches; very pale brown (10YR 7/3) very gravelly sandy loam, pale brown (10YR 6/3) moist; moderate fine subangular blocky structure; many very fine and fine roots; many very fine and fine pores; 5 percent rounded cobbles and 40 percent rounded pebbles; disseminated lime, common fine and medium threads and masses of lime, many distinct lime coatings on fragments; violently effervescent; moderately alkaline (pH 8.4); gradual irregular boundary.

2Bk3—32 to 60 inches; light gray (10YR 7/2) very gravelly sandy loam, pale brown (10YR 6/3) moist; single grain; loose, nonsticky and nonplastic; few fine roots; 10 percent cobbles and 45 percent pebbles; disseminated lime, many distinct lime casts on fragments; violently effervescent; strongly alkaline (pH 8.6).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 6 and 18 inches

*Thickness of the mollic epipedon:* 7 to 15 inches

*Depth to Bk horizon:* 8 to 13 inches

*Ap horizon:*

Hue—10YR or 2.5Y

Chroma—2 or 3

Texture—sandy loam or loam

Clay content—12 to 27 percent

Content of rock fragments—0 to 35 percent (0 to 15 percent cobbles, 0 to 20 percent pebbles)

Reaction—pH 6.6 to 7.8

*Bw horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 3 or 4 moist

Chroma—2, 3, or 4

Texture—loam or sandy clay loam

Clay content—20 to 27 percent

Content of rock fragments—0 to 35 percent (0 to 10 percent cobbles, 0 to 25 percent pebbles)

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 6.6 to 8.4

*Bk1 horizon:*

Hue—10YR or 2.5Y

Value—5, 6, 7, or 8 dry; 4, 5, 6, or 7 moist

Chroma—1, 2, 3, or 4

Texture—sandy loam or loam

Clay content—10 to 20 percent

Content of rock fragments—5 to 35 percent (0 to 5 percent cobbles, 5 to 30 percent pebbles)

Calcium carbonate equivalent—15 to 25 percent  
Reaction—pH 7.9 to 8.4

*2Bk horizon:*

Hue—10YR or 2.5Y  
Value—6, 7, or 8 dry; 6 or 7 moist  
Chroma—2, 3, or 4  
Texture—sandy loam, coarse sandy loam, or loamy sand  
Clay content—0 to 10 percent  
Content of rock fragments—35 to 60 percent (0 to 10 percent cobbles, 35 to 50 percent pebbles)  
Calcium carbonate equivalent—5 to 20 percent  
Reaction—pH 7.9 to 9.0

## Skyview Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, ridges, and side slopes of hills

*Parent material:* Local colluvium, slope alluvium, and residuum derived from granite

*Slope range:* 8 to 60 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 38 to 42 degrees F

*Frost-free period:* 90 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Haplustalfs

### Typical Pedon

Skyview very cobbly sandy loam, in an area of Elmark, very bouldery-Skyview, very bouldery-Rock outcrop complex, 15 to 45 percent slopes; in a forested area, 1,400 feet north and 1,000 feet west of the southeast corner of sec. 18, T. 9 N., R. 3 W.

Oi—2 inches to 0; organic mat of partially decomposed needles, leaves, and twigs.

A—0 to 4 inches; gray (10YR 5/1) very cobbly sandy loam, very dark gray (10YR 3/1) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine, common fine, and few medium roots; many very fine and fine pores and few medium pores; 35 percent cobbles and 15 percent pebbles; neutral (pH 7.0); clear smooth boundary.

E—4 to 16 inches; light brownish gray (2.5Y 6/2) very cobbly sandy loam, dark grayish brown (2.5Y 4/2) moist; weak medium and fine subangular blocky

structure; soft, very friable, slightly sticky and nonplastic; many very fine, common fine, and few medium roots; many very fine and few fine pores; 10 percent stones, 25 percent cobbles, and 20 percent pebbles; neutral (pH 6.7); gradual wavy boundary.

Bt/E—16 to 25 inches; 75 percent brown (10YR 5/3) very cobbly sandy clay loam, brown (10YR 4/3) moist (Bt part); 25 percent light brownish gray (10YR 6/2) very cobbly sandy loam, grayish brown (10YR 5/2) moist (E part); moderate medium prismatic structure parting to moderate medium and fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots and few medium roots; many very fine and few fine pores; many faint clay films bridging sand grains in Bt part; 10 percent stones, 25 percent cobbles, and 15 percent pebbles; slightly acid (pH 6.5); clear wavy boundary.

Cr—25 to 29 inches; light yellowish brown (2.5Y 6/4), decomposed granite bedrock (grus) that crushes to very gravelly coarse sand.

R—29 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bt/E horizon:* 9 to 16 inches

*Depth to Cr horizon:* 20 to 38 inches

*Depth to R layer:* 23 to 40 inches

*Percent of surface covered by boulders:* 0.1 to 3.0 percent

*A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 3 or 4 moist

Chroma—1, 2, or 3

Texture—sandy loam or loam

Clay content—10 to 25 percent

Content of rock fragments—20 to 60 percent (0 to 5 percent stones, 5 to 35 percent cobbles, 15 to 25 percent pebbles)

Reaction—pH 6.1 to 7.3

*E horizon:*

Hue—10YR or 2.5Y

Value—6 or 7 dry; 4 or 5 moist

Chroma—1, 2, or 3

Texture—sandy loam or sandy clay loam

Clay content—10 to 25 percent

Content of rock fragments—35 to 60 percent (0 to 10 percent stones, 15 to 25 percent cobbles, 20 to 25 percent pebbles)

Reaction—pH 6.1 to 7.3

*Bt/E horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry, 4 or 5 moist (Bt part); 6 or 7 dry, 5 or 6 moist (E part)

Chroma—2, 3, or 4

Texture—sandy clay loam (Bt part); sandy loam or sandy clay loam (E part)

Clay content—18 to 30 percent

Content of rock fragments—35 to 60 percent (0 to 10 percent stones, 20 to 25 percent cobbles, 15 to 25 percent pebbles)

Reaction—pH 6.1 to 7.3

## Stemple Family

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments and side slopes of mountains

*Parent material:* Colluvium and slope alluvium derived from fine grained igneous and argillite rocks

*Slope range:* 35 to 60 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Typic Palecryalfs

### Typical Pedon

Stemple cobbly loam, 35 to 60 percent slopes, very stony, in a forested area, 2,450 feet south and 1,700 feet west of the northeast corner of sec. 36, T. 9 N., R. 3 W.

Oi—2 inches to 0; forest litter of partially decomposed needles, twigs, and roots.

E1—0 to 4 inches; light brownish gray (10YR 6/2) cobbly loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium and coarse roots; 15 percent cobbles and 10 percent pebbles; neutral (pH 6.6); clear wavy boundary.

E2—4 to 19 inches; light gray (10YR 7/2) very cobbly loam, grayish brown (10YR 5/2) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium and

coarse roots; many very fine pores; 40 percent cobbles and 20 percent pebbles; moderately acid (pH 5.6); clear wavy boundary.

E/Bt—19 to 36 inches; 70 percent tongues of light brownish gray (10YR 6/2) extremely cobbly loam, grayish brown (10YR 5/2) moist (E part); 30 percent yellowish brown (10YR 5/4) extremely cobbly loam, dark yellowish brown (10YR 4/4) moist (Bt part); moderate medium and fine subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; common very fine and fine roots and few medium roots; many very fine pores; common distinct clay films on faces of peds; many silt and sand skeletons on faces of peds; 15 percent stones, 30 percent cobbles, and 20 percent pebbles; moderately acid (pH 5.7); gradual wavy boundary.

Bt/E—36 to 60 inches; 70 percent yellowish brown (10YR 5/4) extremely cobbly loam, dark yellowish brown (10YR 4/4) moist (Bt part); 30 percent tongues of light brownish gray (10YR 6/2) extremely cobbly loam, grayish brown (10YR 5/2) moist (E part); moderate medium and fine subangular blocky structure; hard, friable, moderately sticky and moderately plastic; few fine and medium roots; many very fine pores; many distinct clay films on faces of peds; many faint silt and sand skeletons on faces of peds in the upper 6 inches; 15 percent stones, 30 percent cobbles, and 20 percent pebbles; slightly acid (pH 6.3).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bt/E horizon:* 25 to 50 inches

*Percent of surface covered by stones/boulders:* 0.1 to 3.0 percent

#### *E1 horizon:*

Hue—10YR or 2.5Y

Value—6 or 7 dry; 4, 5, or 6 moist

Chroma—2 or 3

Clay content—15 to 25 percent

Content of rock fragments—15 to 30 percent (10 to 20 percent cobbles or stones, 5 to 15 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *E2 horizon:*

Hue—10YR or 2.5Y

Value—6, 7, or 8 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Clay content—10 to 20 percent

Content of rock fragments—35 to 80 percent (0 to 40 percent cobbles or stones, 20 to 60 percent pebbles)

Reaction—pH 5.1 to 6.5

*E/Bt horizon:*

Hue—7.5YR to 2.5Y

Value—6, 7, or 8 dry, 4, 5, or 6 moist (E part); 5 or 6 dry, 4 or 5 moist (Bt part)

Chroma—2, 3, or 4 (E part); 4, 5, or 6 (Bt part)

Clay content—15 to 27 percent

Content of rock fragments—35 to 80 percent (0 to 45 percent cobbles and stones, 20 to 70 percent pebbles)

Reaction—pH 5.1 to 6.5

*Bt/E horizon:*

Hue—7.5YR to 2.5Y

Value—5 or 6 dry, 4 or 5 moist (Bt part); 6, 7, or 8 dry, 4, 5, or 6 moist (E part)

Chroma—4, 5, or 6 (Bt part); 2, 3, or 4 (E part)

Clay content—27 to 35 percent

Content of rock fragments—60 to 80 percent (10 to 45 percent cobbles and stones, 20 to 60 percent pebbles)

Reaction—pH 5.6 to 6.5

## Surdal Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, ridges, and side slopes of mountains

*Parent material:* Local colluvium, slope alluvium, and residuum derived from hard, fine grained igneous or metamorphic rock

*Slope range:* 2 to 60 percent

*Elevation range:* 5,500 to 8,000 feet

*Annual precipitation:* 15 to 30 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 30 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Ustic Haplocryolls

### Typical Pedon

Surdal cobbly loam, in an area of Surdal, stony-Arrowpeak, very stony, complex, 4 to 25 percent slopes, in rangeland, 650 feet south and 400 feet west of the northeast corner of sec. 1, T. 3 N., R. 4 W.

A1—0 to 7 inches; dark grayish brown (10YR 4/2) cobbly loam, very dark brown (10YR 2/2) moist; moderate fine and medium granular structure;

slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; 10 percent cobbles and 10 percent pebbles; slightly acid (pH 6.2); clear wavy boundary.

A2—7 to 13 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine and fine pores; 15 percent cobbles and 25 percent pebbles; slightly acid (pH 6.2); clear wavy boundary.

Bw1—13 to 23 inches; grayish brown (10YR 5/2) very cobbly loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine and fine pores; 15 percent cobbles and 30 percent pebbles; slightly acid (pH 6.4); gradual wavy boundary.

Bw2—23 to 31 inches; brown (10YR 5/3) very cobbly loam, brown (10YR 4/3) moist; weak coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots and few medium roots; common very fine and fine pores; 30 percent cobbles and 30 percent pebbles; slightly acid (pH 6.4); clear wavy boundary.

R—31 inches; slightly fractured, hard, fine grained igneous bedrock.

### Range in Characteristics

*Soil temperature:* 36 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 14 inches

*Depth to bedrock:* 20 to 40 inches

*Percent of surface covered by stones/boulders:* 0.01 to 3.0 percent

*A horizon:*

Hue—2.5Y or 10YR

Value—3 or 4 dry; 2 or 3 moist

Clay content—18 to 27 percent

Content of rock fragments—15 to 50 percent (0 to 15 percent cobbles, stones, and boulders; 10 to 30 percent pebbles)

Reaction—pH 6.1 to 6.5

*Bw1 horizon:*

Hue—2.5Y or 10YR

Value—5 or 6 dry; 4 or 5 moist

Chroma—2 or 3

Texture—loam or sandy clay loam

Clay content—18 to 27 percent  
 Content of rock fragments—35 to 60 percent (10 to 20 percent cobbles, 25 to 40 percent pebbles)  
 Reaction—pH 6.1 to 6.5

**Bw<sub>2</sub> horizon:**

Hue—7.5YR, 10YR, or 2.5Y  
 Value—5 or 6 dry; 4 or 5 moist  
 Chroma—2 or 3  
 Texture—loam, sandy clay loam, or sandy loam  
 Clay content—18 to 27 percent  
 Content of rock fragments—35 to 80 percent (5 to 30 percent cobbles, 30 to 50 percent pebbles)  
 Reaction—pH 6.1 to 6.5

**Tepecreek Series**

*Depth class:* Moderately deep (20 to 40 inches) to weathered granite bedrock (grus) and deep (40 to 60 inches) to hard granite bedrock

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour) above the BC horizon and moderately rapid (2.0 to 6.0 inches per hour) in the BC horizon

*Landform:* Escarpments, ridges, and side slopes of mountains

*Parent material:* Local colluvium, slope alluvium, and residuum derived from granite

*Slope range:* 8 to 60 percent

*Elevation range:* 5,500 to 8,000 feet

*Annual precipitation:* 15 to 30 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 30 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Ustic Haplocryalfs

**Typical Pedon**

Tepecreek very gravelly sandy clay loam, in an area of Bobowic, very bouldery-Rock outcrop-Tepecreek, very bouldery, complex, 25 to 60 percent slopes; in a forested area, 1,350 feet south and 1,475 feet west of the northeast corner of sec. 32, T. 9 N., R. 2 W.

Oi—1 inch to 0; forest litter of partially decomposed needles, twigs, and leaves.

A—0 to 2 inches; grayish brown (10YR 5/2) very gravelly sandy clay loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and few fine roots; many very fine and fine pores and few medium pores; 35 percent granite

pebbles; slightly acid (pH 6.3); clear smooth boundary.

E—2 to 8 inches; brown (10YR 5/3) very gravelly sandy clay loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and few fine roots; many very fine and fine pores and few medium pores; 40 percent granite pebbles; slightly acid (pH 6.2); clear smooth boundary.

Bt—8 to 18 inches; yellowish brown (10YR 5/4) very gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; many very fine roots and few fine and medium roots; many very fine and few fine pores; many faint clay films bridging sand grains; 40 percent granite pebbles; slightly acid (pH 6.1); clear wavy boundary.

BC—18 to 35 inches; olive brown (2.5Y 4/4) very gravelly sandy loam, very dark grayish brown (2.5Y 3/2) moist; weak very fine and fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine and few fine roots; many very fine and few fine pores; 55 percent granite pebbles; neutral (pH 6.6); clear wavy boundary.

Cr—35 to 52 inches; light olive brown (2.5Y 5/4), decomposed granite bedrock (grus) that crushes to very gravelly loamy coarse sand.

R—52 inches; hard granite bedrock.

**Range in Characteristics**

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bt horizon:* 5 to 12 inches

*Depth to Cr horizon:* 20 to 40 inches

*Depth to R layer:* 40 to 60 inches

*Percent of surface covered by stones/boulders:* 0.01 to 3.0 percent

**A horizon:**

Hue—10YR or 2.5Y

Value—4 or 5 dry; 3 or 4 moist

Chroma—2 or 3

Texture—coarse sandy loam or sandy clay loam

Clay content—10 to 25 percent

Content of rock fragments—5 to 50 percent pebbles

Reaction—pH 6.1 to 7.3

**E horizon:**

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist  
 Chroma—2 or 3  
 Texture—coarse sandy loam, sandy loam, or sandy clay loam  
 Clay content—10 to 25 percent  
 Content of rock fragments—5 to 50 percent pebbles (mostly less than 7 mm in diameter)  
 Reaction—pH 6.1 to 7.3

*Bt horizon:*

Hue—10YR or 2.5Y  
 Value—5 or 6 dry; 4 or 5 moist  
 Chroma—2, 3, or 4  
 Clay content—20 to 30 percent  
 Content of rock fragments—35 to 60 percent pebbles (mostly less than 7 mm in diameter)  
 Reaction—pH 6.1 to 7.3

*BC horizon:*

Hue—10YR or 2.5Y  
 Value—4, 5, or 6 dry; 3, 4, or 5 moist  
 Chroma—2, 3, or 4  
 Texture—coarse sandy loam or sandy loam  
 Clay content—10 to 18 percent  
 Content of rock fragments—35 to 60 percent pebbles (mostly less than 10 mm in diameter)  
 Reaction—pH 6.1 to 7.3

## Tiban Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans and side slopes of mountains

*Parent material:* Slope alluvium and colluvium derived mainly from igneous and metamorphic rock

*Slope range:* 1 to 70 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 34 to 44 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Ustic Haplocryolls

### Typical Pedon

Tiban gravelly loam, in an area of Tiban, bouldery-Cheadle, very bouldery, complex, 15 to 35 percent slopes, in rangeland, 2,075 feet west and 1,600 feet north of the southeast corner of sec. 4, T. 5 N., R. 2 W.

A—0 to 7 inches; very dark grayish brown (10YR 3/2) gravelly loam, black (10YR 2/1) moist; moderate medium granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine

and fine roots and few medium roots; 25 percent pebbles; neutral (pH 6.8); clear wavy boundary.

Bw1—7 to 14 inches; dark grayish brown (10YR 4/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots and few medium roots; common fine and very fine pores; 40 percent pebbles; slightly alkaline (pH 7.4); clear wavy boundary.

Bw2—14 to 28 inches; brown (10YR 5/3) very gravelly loam, brown (10YR 4/3) moist; moderate medium and coarse prismatic structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots and few medium roots; common fine and very fine pores; 45 percent pebbles; slightly alkaline (pH 7.6); gradual wavy boundary.

Bk1—28 to 42 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 5/3) moist; moderate coarse prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium and coarse roots; common fine and very fine pores; 5 percent cobbles and 40 percent pebbles; disseminated lime, common fine and medium threads and masses of lime, common faint lime coatings on undersides of fragments; violently effervescent; moderately alkaline (pH 8.3); gradual irregular boundary.

Bk2—42 to 60 inches; brown (10YR 5/3) very gravelly loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; common very fine and fine roots; common fine and very fine pores; 5 percent cobbles and 40 percent pebbles; disseminated lime, common fine and medium threads and masses of lime, common distinct lime coatings on fragments; strongly effervescent; moderately alkaline (pH 8.2).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 15 inches

*Depth to Bk horizon:* 20 to 32 inches

*Percent of surface covered by stones/boulders:* 0.01 to 25 percent

*A horizon:*

Hue—7.5YR, 10YR, or 2.5YR

Value—3 or 4 dry; 2 or 3 moist

Chroma—1, 2, or 3

Clay content—18 to 27 percent

Content of rock fragments—15 to 70 percent (0 to 30 percent cobbles and stones, 15 to 40 percent pebbles)

Reaction—pH 6.6 to 7.3

*Bw horizon:*

Hue—7.5YR or 10YR

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—1, 2, or 3

Texture—loam or clay loam

Clay content—18 to 35 percent

Content of rock fragments—15 to 50 percent (0 to 20 percent cobbles and stones, 15 to 45 percent pebbles)

Calcium carbonate equivalent—0 to 8 percent

Reaction—pH 6.6 to 8.4

*Bk horizon:*

Hue—7.5YR or 10YR

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—1, 2, or 3

Texture—loam or clay loam

Clay content—18 to 35 percent

Content of rock fragments—15 to 60 percent (0 to 20 percent cobbles and stones, 15 to 40 percent pebbles)

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.4 to 8.4

## Tibkey Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Somewhat poorly drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, valleys, and side slopes of mountains

*Parent material:* Slope alluvium or alpine glacial till derived from fine grained igneous and metamorphic rocks

*Slope range:* 2 to 15 percent

*Elevation range:* 5,500 to 7,500 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Fluvaquentic Haplocryolls

### Typical Pedon

Tibkey mucky silt loam, in an area of Marcel, very bouldery-Tibkey, bouldery, complex, 2 to 8 percent slopes, in rangeland, 1,700 feet north and 350 feet east of the southwest corner of sec. 1, T. 4 N., R. 4 W.

A1—0 to 2 inches; very dark grayish brown (10YR 3/2) mucky silt loam, very dark brown (10YR 2/2)

moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; 10 percent pebbles; slightly acid (pH 6.2); clear wavy boundary.

A2—2 to 8 inches; very dark gray (10YR 3/1) mucky silt loam, black (10YR 2/1) moist; strong medium prismatic structure parting to moderate fine and medium subangular blocky; hard, firm, slightly sticky and slightly plastic; many very fine and fine roots; many fine and very fine pores; 10 percent pebbles; neutral (pH 6.6); clear wavy boundary.

Bw1—8 to 13 inches; grayish brown (10YR 5/2) very gravelly loam, dark grayish brown (10YR 4/2) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, firm, slightly sticky and slightly plastic; many very fine and fine roots; many fine and very fine pores; 40 percent pebbles; neutral (pH 6.6); clear wavy boundary.

Bw2—13 to 25 inches; light brownish gray (10YR 6/2) very gravelly loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; 5 percent cobbles and 30 percent pebbles; neutral (pH 6.8); gradual wavy boundary.

Bw3—25 to 32 inches; light gray (10YR 7/2) very gravelly loam, brown (10YR 5/3) moist; few fine distinct yellowish brown (10YR 5/6) redox concentrations; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; 5 percent cobbles and 30 percent pebbles; neutral (pH 6.8); gradual irregular boundary.

BC—32 to 60 inches; very pale brown (10YR 7/3) very gravelly loam, pale brown (10YR 6/3) moist; common fine prominent strong brown (7.5YR 5/6) redox concentrations; massive; slightly hard, very friable, slightly sticky and nonplastic; common very fine and fine roots; common very fine and fine pores; 5 percent cobbles and 40 percent pebbles; slightly alkaline (pH 7.4).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 8 to 15 inches

*Depth to the water table:* 24 to 42 inches from May through July

*Percent of surface covered by boulders:* 0.01 to 0.1 percent

*A horizon:*

Hue—10YR, 2.5Y, or N  
 Value—2, 3, or 4 dry; 2 or 3 moist  
 Chroma—0, 1, or 2  
 Texture—loam, mucky silt loam, or mucky loam  
 Clay content—15 to 27 percent  
 Content of rock fragments—10 to 40 percent (0 to 15 percent cobbles, stones, or boulders; 10 to 35 percent pebbles)  
 Reaction—pH 6.1 to 7.3

*Bw1 and Bw2 horizons:*

Hue—10YR or 2.5Y  
 Value—4, 5, or 6 dry; 3, 4, or 5 moist  
 Chroma—2 or 3  
 Texture—silt loam, clay loam, sandy clay loam, or loam  
 Clay content—18 to 30 percent  
 Content of rock fragments—15 to 50 percent (0 to 15 percent cobbles, stones, or boulders; 15 to 40 percent pebbles)  
 Reaction—pH 6.6 to 7.3

*Bw3 horizon:*

Value—5, 6, or 7 dry; 4, 5, or 6 moist  
 Chroma—2 or 3  
 Texture—loam, clay loam, or sandy clay loam  
 Clay content—18 to 30 percent  
 Content of rock fragments—35 to 60 percent (0 to 10 percent cobbles and stones, 30 to 50 percent pebbles)  
 Reaction—pH 6.6 to 7.3

*BC horizon:*

Value—6 or 7 dry; 5 or 6 moist  
 Chroma—2, 3, or 4  
 Texture—loam or sandy clay loam  
 Clay content—18 to 27 percent  
 Content of rock fragments—35 to 60 percent (0 to 10 percent cobbles, 35 to 50 percent pebbles)  
 Reaction—pH 6.6 to 7.8

**Tigeron Family**

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, ridges, saddles, and side slopes of mountains

*Parent material:* Colluvium and slope alluvium derived mainly from fine grained igneous and metamorphic rocks

*Slope range:* 2 to 70 percent slopes

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 40 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Eutric Haplocryalfs

**Typical Pedon**

Tigeron very cobbly loam, in an area of Tigeron, very bouldery-Redfern, bouldery-Rock outcrop complex, 15 to 45 percent slopes, warm; in a forested area, 1,050 feet south and 2,400 feet east of the northwest corner of sec. 5, T. 5 N., R. 3 W.

Oe—2 inches to 0; forest litter of undecomposed and decomposed needles, twigs, and cones.

A—0 to 2 inches; grayish brown (2.5Y 5/2) very cobbly loam, very dark grayish brown (2.5Y 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium and coarse roots; 20 percent cobbles and 35 percent pebbles; neutral (pH 7.2); clear smooth boundary.

E1—2 to 8 inches; light brownish gray (2.5Y 6/2) extremely cobbly loam, grayish brown (2.5Y 5/2) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots and common medium and coarse roots; many very fine and fine pores; 25 percent cobbles and 40 percent pebbles; neutral (pH 6.8); clear wavy boundary.

E2—8 to 19 inches; light gray (10YR 7/1) extremely gravelly loam, pale brown (10YR 6/3) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium and coarse roots; 15 percent cobbles and 50 percent pebbles; slightly acid (pH 6.1); clear wavy boundary.

Bt1—19 to 36 inches; light yellowish brown (2.5Y 6/4) extremely gravelly clay loam, light olive brown (2.5Y 5/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, moderately sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; many distinct clay films on faces of peds and bridging sand grains; 15 percent cobbles and 50 percent pebbles; neutral (pH 6.9); gradual wavy boundary.

Bt2—36 to 60 inches; pale brown (10YR 6/3) extremely cobbly sandy clay loam, yellowish brown (10YR 5/4) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots and few medium and coarse roots; many

very fine pores; common distinct clay films on faces of pedis and bridging sand grains; 30 percent cobbles and 50 percent pebbles; slightly acid (pH 6.2).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bt horizon:* 10 to 24 inches

*Percent of surface covered by stones/boulders:* 0.01 to 3.0 percent

#### A horizon:

Hue—2.5Y, 10YR, or 7.5YR

Value—4 or 5 dry; 3 or 4 moist

Chroma—1, 2, or 3

Clay content—15 to 25 percent

Content of rock fragments—35 to 70 percent (15 to 40 percent cobbles and stones, 20 to 40 percent pebbles)

Reaction—pH 5.6 to 7.3

#### E horizon:

Hue—2.5Y, 10YR, or 7.5YR

Value—6 or 7 dry; 4, 5, or 6 moist

Chroma—1, 2, or 3

Clay content—15 to 25 percent

Content of rock fragments—35 to 70 percent (15 to 40 percent cobbles and stones, 20 to 50 percent pebbles)

Reaction—pH 5.6 to 7.3

#### Bt horizon:

Hue—7.5YR, 10YR, or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—loam, clay loam, or sandy clay loam

Clay content—18 to 35 percent

Content of rock fragments—35 to 80 percent (10 to 30 percent cobbles and stones, 15 to 50 percent pebbles)

Reaction—pH 5.6 to 7.3

### Tineman Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Moraines, valleys, and side slopes of mountains

*Parent material:* Gravelly and cobbly alluvium derived from mixed rock sources

*Slope range:* 2 to 25 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Ustic Haplocryolls

### Typical Pedon

Tineman gravelly loam, in an area of Tineman, very stony-Franconi, bouldery-Rock outcrop complex, 4 to 25 percent slopes; in a forested area, 1,650 feet west and 2,475 feet north of the southeast corner of sec. 19, T. 4 N., R. 3 W.

A1—0 to 3 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, friable, nonsticky and nonplastic; many fine and very fine, common medium, and few coarse roots; 5 percent rounded cobbles and 20 percent rounded pebbles; neutral (pH 6.6); clear wavy boundary.

A2—3 to 9 inches; brown (10YR 4/3) gravelly loam, dark brown (10YR 3/3) moist; moderate medium granular structure; slightly hard, friable, slightly sticky and nonplastic; many fine and very fine, common medium, and few coarse roots; 5 percent rounded cobbles and 15 percent rounded pebbles; neutral (pH 6.6); clear wavy boundary.

Bw1—9 to 25 inches; brown (10YR 5/3) extremely gravelly sandy loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common fine and very fine roots; 20 percent rounded cobbles and 50 percent rounded pebbles; neutral (pH 6.8); gradual wavy boundary.

Bw2—25 to 30 inches; light olive brown (2.5Y 5/4) gravelly sandy loam, dark brown (10YR 3/3) moist; weak medium prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; 10 percent rounded cobbles and 25 percent rounded pebbles; neutral (pH 7.2); gradual wavy boundary.

2C—30 to 60 inches; brown (10YR 5/3) very gravelly loamy coarse sand, dark brown (10YR 3/3) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; 10 percent rounded cobbles and 45 percent rounded pebbles; slightly alkaline (pH 7.4).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 8 and 24 inches

*Thickness of the mollic epipedon:* 9 to 15 inches

*Percent of surface covered by stones/boulders:* 0.1 to 3.0 percent

*A horizon:*

Value—3 or 4 dry; 2 or 3 moist  
 Chroma—2 or 3  
 Clay content—15 to 27 percent  
 Content of rock fragments—15 to 35 percent (5 to 15 percent cobbles, 10 to 20 percent pebbles)  
 Reaction—pH 6.1 to 7.3

*Bw1 horizon:*

Hue—10YR or 7.5YR  
 Value—5 or 6 dry; 3 or 4 moist  
 Chroma—3, 4, or 6  
 Texture—loam, fine sandy loam, or sandy loam  
 Clay content—15 to 27 percent  
 Content of rock fragments—35 to 75 percent (10 to 25 percent cobbles, 25 to 50 percent pebbles)  
 Reaction—pH 6.1 to 7.3

*Bw2 horizon:*

Hue—10YR or 2.5Y  
 Value—5 or 6 dry; 3 or 4 moist  
 Chroma—3, 4, or 6  
 Clay content—5 to 15 percent  
 Content of rock fragments—35 to 60 percent (10 to 20 percent cobbles, 25 to 45 percent pebbles)  
 Reaction—pH 6.1 to 7.3

*2C horizon:*

Value—4, 5, or 6 dry; 3, 4, or 5 moist  
 Chroma—3, 4, or 6  
 Texture—coarse sand or loamy coarse sand  
 Clay content—5 to 15 percent  
 Content of rock fragments—35 to 70 percent (10 to 25 percent cobbles and stones, 25 to 45 percent pebbles)  
 Reaction—pH 6.6 to 7.8

## **Tolbert Series**

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, ridges, interfluves, and side slopes of hills

*Parent material:* Residuum derived from hard, fine grained sandstone or igneous rock

*Slope range:* 8 to 70 percent

*Elevation range:* 3,600 to 6,200 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Lithic Argiustolls

### **Typical Pedon**

Tolbert very cobbly loam, in an area of Shawmut, bouldery-Shawmut, stony-Tolbert, bouldery, complex, 15 to 35 percent slopes, in rangeland, 300 feet north and 2,600 feet east of the southwest corner of sec. 4, T. 5 N., R. 3 W.

A—0 to 7 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; 30 percent angular cobbles and 10 percent angular pebbles; neutral (pH 6.6); clear wavy boundary.

Bt—7 to 12 inches; brown (10YR 5/3) very cobbly clay loam, brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; many very fine and fine roots; many very fine and fine pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of pedis and bridging sand grains; 40 percent angular cobbles and 15 percent angular pebbles; neutral (pH 6.8); abrupt smooth boundary.

R—12 inches; hard, fine grained igneous rock.

### **Range in Characteristics**

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the lithic contact (if it occurs at a depth of less than 12 inches)

*Thickness of the mollic epipedon:* 7 to 10 inches

*Depth to Bt horizon:* 5 to 8 inches

*Depth to bedrock:* 10 to 20 inches

*Percent of surface covered by stones/boulders:* 0.01 to 3.0 percent

*A horizon:*

Hue—10YR or 2.5Y  
 Value—4 or 5 dry; 3 or 4 moist  
 Chroma—2 or 3  
 Clay content—15 to 27 percent  
 Content of rock fragments—15 to 60 percent (0 to 10 percent stones, 10 to 30 percent cobbles, 5 to 25 percent pebbles)  
 Reaction—pH 6.6 to 7.3

*Bt horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 3 or 4 moist  
 Chroma—2, 3, or 4  
 Texture—loam or clay loam  
 Clay content—23 to 35 percent  
 Content of rock fragments—35 to 80 percent (0 to 5 percent stones, 20 to 45 percent cobbles, 15 to 30 percent pebbles)  
 Reaction—pH 6.6 to 7.3

## Torpy Series

*Depth class:* Very deep (greater than 60 inches)  
*Drainage class:* Well drained  
*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)  
*Landform:* Alluvial fans and side slopes of mountains  
*Parent material:* Slope alluvium and colluvium derived from tuffaceous volcanic rocks  
*Slope range:* 4 to 60 percent  
*Elevation range:* 5,500 to 8,000 feet  
*Annual precipitation:* 15 to 24 inches  
*Annual air temperature:* 36 to 40 degrees F  
*Frost-free period:* 30 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Vitrandic Eutrocryepts

### Typical Pedon

Torpy gravelly loam, 15 to 35 percent slopes, in a forested area, 2,600 feet east and 200 feet south of the northwest corner of sec. 19, T. 6 N., R. 6 W.

Oi—1 inch to 0; forest litter of partially decomposed needles and twigs.

A—0 to 3 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate thin platy structure; soft, very friable, nonsticky and slightly plastic; common very fine and fine roots; common very fine and fine pores; 15 percent welded tuff pebbles; moderately acid (pH 6.0); clear smooth boundary.

E—3 to 8 inches; light brownish gray (10YR 6/2) loam, grayish brown (10YR 5/2) moist; weak medium granular structure; soft, very friable, slightly sticky and moderately plastic; common very fine and fine roots; common very fine and fine pores; 10 percent welded tuff pebbles; slightly acid (pH 6.2); gradual smooth boundary.

Bw—8 to 34 inches; light gray (10YR 7/2) very cobbly loam, grayish brown (10YR 5/2) moist; moderate medium angular blocky structure; soft, very friable, slightly sticky and moderately plastic; common very fine and few fine roots; common very fine and fine pores; 20 percent welded tuff cobbles and 20

percent welded tuff pebbles; slightly acid (pH 6.4); gradual smooth boundary.

BC—34 to 60 inches; light gray (10YR 7/1) very cobbly loam, gray (10YR 5/1) moist; single grain; loose, slightly sticky and slightly plastic; few coarse roots; 25 percent welded tuff cobbles and 25 percent welded tuff pebbles; slightly acid (pH 6.5).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F  
*Moisture control section:* Between the depths of 8 and 24 inches

*Content of volcanic glass:* More than 30 percent in the coarse silt and sand fraction of one or more horizons

*Percent of surface covered by stones/boulders:* 0 to 20 percent

*A horizon:*  
 Hue—10YR or 2.5Y  
 Value—4 or 5 dry; 2 or 3 moist  
 Chroma—1 or 2  
 Clay content—12 to 23 percent  
 Content of rock fragments—5 to 35 percent (0 to 20 percent stones and cobbles, 5 to 20 percent pebbles)  
 Reaction—pH 5.6 to 7.3

*E horizon:*  
 Hue—10YR or 2.5Y  
 Value—5 or 6 dry; 3, 4, or 5 moist  
 Chroma—1 or 2  
 Texture—loam or sandy loam  
 Clay content—12 to 20 percent  
 Content of rock fragments—0 to 35 percent (0 to 20 percent stones and cobbles, 0 to 15 percent pebbles)  
 Reaction—pH 5.6 to 7.3

*Bw horizon:*  
 Hue—10YR or 2.5Y  
 Value—6 or 7 dry; 4 or 5 moist  
 Chroma—1 or 2  
 Texture—loam or sandy loam  
 Clay content—12 to 18 percent  
 Content of rock fragments—35 to 60 percent (15 to 35 percent stones and cobbles, 20 to 25 percent pebbles)  
 Reaction—pH 5.6 to 7.3

*BC horizon:*  
 Hue—10YR or 2.5Y  
 Value—7 or 8 dry; 5 or 6 moist  
 Chroma—1 or 2  
 Texture—loam, sandy loam, or loamy sand

Clay content—5 to 15 percent  
 Content of rock fragments—35 to 70 percent (15 to 45 percent stones and cobbles, 20 to 25 percent pebbles)  
 Reaction—pH 6.1 to 7.8

## Tropal Series

*Depth class:* Shallow (10 to 20 inches)  
*Drainage class:* Well drained  
*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)  
*Landform:* Ridges and side slopes of mountains  
*Parent material:* Residuum derived from limestone  
*Slope range:* 4 to 70 percent  
*Elevation range:* 5,500 to 7,000 feet  
*Annual precipitation:* 15 to 24 inches  
*Annual air temperature:* 36 to 40 degrees F  
*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, carbonatic Lithic Eutrocryepts

### Typical Pedon

Tropal very gravelly loam, in an area of Tropal, bouldery-Rock outcrop-Whitore, bouldery, complex, 15 to 45 percent slopes; in a forested area, 700 feet west and 1,800 feet north of the southeast corner of sec. 3, T. 5 N., R. 2 W.

Oi— $\frac{1}{2}$  inch to 0; partially decomposed needles, twigs, and leaves.

A—0 to 4 inches; brown (10YR 5/3) very gravelly loam, dark grayish brown (10YR 4/2) moist; moderate medium granular structure; slightly hard, very friable, nonsticky and nonplastic; many fine roots; 5 percent cobbles and 40 percent angular pebbles; disseminated lime, continuous distinct lime coatings on underside of fragments; violently effervescent; moderately alkaline (pH 8.2); abrupt smooth boundary.

Bk—4 to 16 inches; light gray (10YR 7/2) very gravelly loam, grayish brown (10YR 5/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine roots; common very fine and fine pores; 10 percent cobbles and 50 percent angular pebbles; disseminated lime, common fine and medium threads and masses of lime, continuous prominent lime casts on fragments; violently effervescent; moderately alkaline (pH 8.4); clear wavy boundary.

R—16 inches; light gray (10YR 7/1), hard limestone.

## Range in Characteristics

*Soil temperature:* 38 to 42 degrees F  
*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the lithic contact (if it occurs at a depth of less than 12 inches)  
*Depth to bedrock:* 10 to 20 inches  
*Percent of surface covered by stones/boulders:* 0.01 to 3.0 percent

### A horizon:

Hue—10YR or 2.5Y  
 Value—4 or 5 dry; 3 or 4 moist  
 Chroma—2 or 3  
 Clay content—15 to 25 percent  
 Content of rock fragments—15 to 60 percent (0 to 15 percent stones and cobbles, 15 to 45 percent pebbles)  
 Calcium carbonate equivalent—0 to 15 percent  
 Reaction—pH 7.4 to 8.4

### Bk horizon:

Hue—10YR or 2.5Y  
 Value—5, 6, 7, or 8 dry; 5, 6, or 7 moist  
 Chroma—2 or 3  
 Clay content—10 to 20 percent  
 Content of rock fragments—35 to 80 percent (10 to 20 percent cobbles and stones, 25 to 60 percent pebbles)  
 Calcium carbonate equivalent—40 to 60 percent  
 Reaction—pH 7.4 to 9.0

## Trudau Series

*Depth class:* Shallow (10 to 20 inches)  
*Drainage class:* Well drained  
*Permeability:* Moderately slow (0.2 to 0.6 inch per hour)  
*Landform:* Alluvial fans, stream terraces, flood-plain steps, and knolls  
*Parent material:* Alluvium  
*Slope range:* 0 to 15 percent  
*Elevation range:* 3,800 to 5,000 feet  
*Annual precipitation:* 10 to 14 inches  
*Annual air temperature:* 36 to 40 degrees F  
*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Aridic Haplustepts

### Typical Pedon

Trudau loam, 2 to 8 percent slopes, in rangeland, 1,200 feet north and 1,200 feet west of the southeast

corner of sec. 22, T. 8 S., R. 5 W., Madison County, Montana:

**A**—0 to 2 inches; light gray (10YR 7/2) loam, grayish brown (10YR 5/2) moist; weak very thin platy structure parting to moderate very fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular pores; strongly effervescent; strongly alkaline (pH 8.6); abrupt smooth boundary.

**Bw**—2 to 14 inches; light gray (10YR 7/2) loam, light brownish gray (10YR 6/2) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; many very fine irregular and tubular pores; few fine masses of lime; strongly effervescent; strongly alkaline (pH 8.6); gradual smooth boundary.

**Bk**—14 to 30 inches; very pale brown (10YR 7/3) loam, pale brown (10YR 6/3) moist; weak coarse prismatic structure parting to weak medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; many irregular and tubular pores; common fine and medium masses of lime; strongly effervescent; strongly alkaline (pH 8.6); clear wavy boundary.

**Bkz**—30 to 60 inches; very pale brown (10YR 7/3) loam stratified with sandy loam, pale brown (10YR 6/3) moist; massive; soft, very friable, slightly sticky and nonplastic; few fine roots; many irregular pores; common fine salt crystals; common fine and medium masses of lime; violently effervescent; moderately alkaline (pH 8.4).

### Range in Characteristics

*Soil temperature:* 40 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bk horizon:* 10 to 23 inches

*Depth to Bkz horizon:* 15 to 40 inches

*A horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 3, 4, or 5 moist

Chroma—2 or 3

Texture—loam, silt loam, or clay loam

Clay content—20 to 30 percent

Content of rock fragments—0 to 5 percent pebbles

Calcium carbonate equivalent—5 to 10 percent

Reaction—pH 8.5 to 9.0

*Bw horizon:*

Hue—10YR or 2.5Y

Value—6, 7, or 8 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—loam or clay loam

Clay content—20 to 35 percent

Content of rock fragments—0 to 5 percent pebbles

Electrical conductivity—4 to 16 mmhos/cm

Sodium adsorption ratio—1 to 5

Calcium carbonate equivalent—5 to 10 percent

Reaction—pH 8.5 to 9.0

*Bk horizon:*

Hue—10YR or 2.5Y

Value—6, 7, or 8 dry; 5, 6, or 7 moist

Chroma—2 or 3

Texture—loam or clay loam

Clay content—20 to 35 percent

Content of rock fragments—0 to 15 percent pebbles

Electrical conductivity—4 to 16 mmhos/cm

Sodium adsorption ratio—2 to 15

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 8.5 to 9.0

*Bkz horizon:*

Hue—10YR or 2.5Y

Value—6, 7, or 8 dry; 5, 6, or 7 moist

Chroma—2, 3, or 4

Texture—loam or clay loam

Clay content—18 to 35 percent

Content of rock fragments—0 to 15 percent (0 to 5 percent cobbles, 0 to 10 percent pebbles)

Electrical conductivity—4 to 16 mmhos/cm

Sodium adsorption ratio—2 to 15

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 8.5 to 9.0

### Tuggle Series

*Depth class:* Shallow (10 to 20 inches)

*Drainage class:* Well drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Escarpments, ridges, and side slopes of mountains

*Parent material:* Residuum or slope alluvium derived from granite

*Slope range:* 2 to 60 percent

*Elevation range:* 5,500 to 8,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy, mixed, superactive  
Lithic Haplocryolls

### Typical Pedon

Tuggle very cobbly coarse sandy loam, in an area of Opitz, bouldery-Branham, very bouldery-Tuggle, very bouldery, complex, 8 to 35 percent slopes, in rangeland, 900 feet east and 500 feet south of the northwest corner of sec. 5, T. 3 N., R. 3 W.

A—0 to 7 inches; dark brown (10YR 3/3) very cobbly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots and common medium roots; 20 percent cobbles and 35 percent granite pebbles; neutral (pH 7.2); clear wavy boundary.

Bw—7 to 11 inches; brown (10YR 4/3) gravelly coarse sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots and common medium roots; many very fine and few fine pores; 20 percent granite pebbles; neutral (pH 7.3); clear wavy boundary.

BC—11 to 15 inches; brown (10YR 5/3) gravelly coarse sandy loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine, common fine, and few medium roots; many very fine and few fine pores; 25 percent granite pebbles; neutral (pH 7.3); gradual wavy boundary.

Cr—15 to 18 inches; light brownish gray (10YR 6/2), decomposed granite bedrock (grus) that crushes to very gravelly loamy coarse sand.

R—18 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between a depth of 8 inches and the lithic contact

*Thickness of the mollic epipedon:* 7 to 10 inches

*Depth to Cr horizon:* 10 to 19 inches

*Depth to R layer:* 12 to 20 inches

*Percent of surface covered by stones/boulders:* 0 to 3 percent

*A horizon:*

Hue—10YR or 2.5Y

Value—3, 4, or 5 dry; 2 or 3 moist

Chroma—1, 2, or 3

Clay content—10 to 18 percent

Content of rock fragments—5 to 60 percent (5 to 45 percent pebbles, 0 to 20 percent cobbles, 0 to 5 percent stones)

Reaction—pH 5.6 to 7.3

*Bw horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2 or 3

Texture—coarse sandy loam or sandy loam

Clay content—10 to 18 percent

Content of rock fragments—5 to 25 percent pebbles (mainly less than 7 mm in diameter)

Reaction—pH 6.1 to 7.3

*BC horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—coarse sandy loam or sandy loam

Clay content—10 to 18 percent

Content of rock fragments—10 to 35 percent pebbles (mainly less than 10 mm in diameter)

Reaction—pH 6.1 to 7.3

### Udecide Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Knolls, interfluves, and side slopes of hills

*Parent material:* Slope alluvium or residuum derived from weakly consolidated siltstone, loamstone, and sandstone

*Slope range:* 2 to 15 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Aridic Argiustolls

### Typical Pedon

Udecide sandy clay loam, in an area of Udecide-Varney-Walbert complex, 4 to 25 percent slopes, in rangeland, 2,100 feet north and 2,600 feet east of the southwest corner of sec. 29, T. 2 N., R. 1 W.

A—0 to 5 inches; grayish brown (10YR 5/2) sandy clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and

nonplastic; many very fine and fine roots; many very fine and fine pores; 5 percent rounded pebbles; neutral (pH 7.0); clear wavy boundary.

Bt1—5 to 9 inches; dark grayish brown (10YR 4/2) sandy clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; common distinct dark brown (10YR 3/3) clay films on faces of pedis and bridging sand grains; 5 percent rounded pebbles; neutral (pH 7.2); clear wavy boundary.

Bt2—9 to 14 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; common distinct dark brown (10YR 3/3) clay films on faces of pedis and bridging sand grains; 5 percent rounded pebbles; neutral (pH 7.2); gradual wavy boundary.

Bk1—14 to 20 inches; light brownish gray (10YR 6/2) gravelly loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; 15 percent rounded pebbles; disseminated lime, common fine masses and threads of lime, few faint light gray (10YR 7/1) lime coatings on undersides of pebbles; strongly effervescent; moderately alkaline (pH 8.2); gradual wavy boundary.

Bk2—20 to 28 inches; light brownish gray (10YR 6/2) gravelly sandy clay loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; common very fine and fine roots; common very fine and fine pores; 15 percent rounded pebbles; disseminated lime, common medium masses and threads of lime, common distinct lime coatings on undersides of pebbles; violently effervescent; slightly alkaline (pH 7.8); clear smooth boundary.

Cr—28 to 60 inches; light brownish gray (2.5Y 6/2), weakly consolidated sandstone that crushes to loamy sand.

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 10 inches

*Depth to Bt horizon:* 4 to 8 inches

*Depth to Bk horizon:* 10 to 23 inches

*Depth to Cr horizon:* 20 to 40 inches

#### *A horizon:*

Hue—10YR or 2.5Y

Value—2 or 3 moist

Chroma—2 or 3

Clay content—20 to 30 percent

Content of rock fragments—0 to 15 percent pebbles

Reaction—pH 6.6 to 7.8

#### *Bt horizon:*

Hue—7.5YR, 10YR, or 2.5Y

Value—4, 5, or 6 dry; 3 or 4 moist

Chroma—2 or 3

Texture—loam, clay loam, or sandy clay loam

Clay content—23 to 35 percent

Content of rock fragments—0 to 15 percent pebbles

Reaction—pH 6.6 to 7.8

#### *Bk horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—loam, sandy loam, or sandy clay loam

Clay content—10 to 25 percent

Content of rock fragments—5 to 25 percent pebbles

Calcium carbonate equivalent—10 to 20 percent

Reaction—pH 7.9 to 8.4

### Varney Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, stream terraces, knolls, and side slopes of hills

*Parent material:* Slope alluvium derived from mixed rock sources

*Slope range:* 0 to 35 percent

*Elevation range:* 3,800 to 5,200 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Calcic Argiustolls

### Typical Pedon

Varney sandy clay loam, 2 to 8 percent slopes, in cropland, 1,200 feet north and 2,100 feet west of the southeast corner of sec. 19, T. 2 N., R. 1 W.

Ap—0 to 6 inches; grayish brown (2.5Y 5/2) sandy clay loam, very dark grayish brown (2.5Y 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; 5 percent rounded pebbles; neutral (pH 7.0); abrupt smooth boundary.

Bt1—6 to 12 inches; dark grayish brown (10YR 4/2) sandy clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine pores; continuous faint clay films on faces of peds and bridging sand grains; 5 percent rounded pebbles; neutral (pH 7.0); clear wavy boundary.

Bt2—12 to 18 inches; brown (10YR 5/3) sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine pores; common distinct dark grayish brown (10YR 4/2) (moist) clay films on faces of peds and bridging sand grains; 5 percent rounded pebbles; neutral (pH 7.2); clear wavy boundary.

Bk1—18 to 24 inches; light yellowish brown (2.5Y 6/4) sandy clay loam, brown (10YR 5/3) moist; weak coarse prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine pores; 5 percent rounded pebbles; disseminated lime, few fine and medium threads and masses of lime, common faint lime coatings on undersides of fragments; strongly effervescent; slightly alkaline (pH 7.8); clear wavy boundary.

Bk2—24 to 33 inches; light yellowish brown (2.5Y 6/4) sandy loam, light olive brown (2.5Y 5/4) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common very fine and fine roots; common very fine pores; 5 percent rounded pebbles; disseminated lime, common fine and medium threads and masses of lime, common faint lime coatings on fragments; violently effervescent; moderately alkaline (pH 8.4); gradual wavy boundary.

BC—33 to 60 inches; light yellowish brown (2.5Y 6/4) sandy clay loam consisting of stratified sandy loam, sandy clay loam, and loam, light olive brown (2.5Y 5/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine roots; few fine pores; 10 percent rounded pebbles; disseminated

lime; slightly effervescent; moderately alkaline (pH 8.4).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 16 inches

*Depth to Bt horizon:* 5 to 11 inches

*Depth to Bk horizon:* 13 to 20 inches

*Percent of surface covered by stones:* 0 to 0.1 percent

#### *Ap horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 2 or 3 moist

Chroma—2 or 3

Texture—clay loam, loam, or sandy clay loam

Clay content—18 to 35 percent

Content of rock fragments—0 to 35 percent (0 to 15 percent cobbles, 0 to 20 percent pebbles)

Reaction—pH 6.6 to 7.8

#### *Bt horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2, 3, or 4

Texture—clay loam or sandy clay loam

Clay content—27 to 35 percent

Content of rock fragments—5 to 35 percent (0 to 10 percent cobbles, 5 to 30 percent pebbles)

Reaction—pH 6.6 to 7.8

#### *Bk horizon:*

Hue—10YR or 2.5Y

Value—5, 6, 7, or 8 dry; 4, 5, 6, or 7 moist

Chroma—2, 3, or 4

Texture—sandy loam, loam, clay loam, or sandy clay loam

Clay content—10 to 30 percent

Content of rock fragments—5 to 35 percent (0 to 5 percent cobbles, 5 to 30 percent pebbles)

Calcium carbonate equivalent—15 to 30 percent

Reaction—pH 7.4 to 8.4

#### *BC horizon:*

Hue—2.5Y, 10YR, or 7.5YR

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—sandy clay loam or sandy loam consisting of stratified sandy clay loam, sandy loam, loam, and clay loam

Clay content—5 to 20 percent

Content of rock fragments—5 to 35 percent (0 to 5 percent cobbles, 5 to 30 percent pebbles)

Calcium carbonate equivalent—10 to 25 percent  
Reaction—pH 7.9 to 8.4

## Vendome Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour) above the 2Bk horizon and rapid (6.0 to 20.0 inches per hour) in the 2Bk horizon

*Landform:* Alluvial fans, stream terraces, knolls, and plains

*Parent material:* Gravelly and cobbly alluvium derived from mixed rock sources

*Slope range:* 0 to 25 percent

*Elevation range:* 4,000 to 5,500 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Sandy-skeletal, mixed, frigid Aridic Haplustolls

### Typical Pedon

Vendome sandy loam, 0 to 8 percent slopes, in rangeland, 750 feet south and 210 feet west of the northeast corner of sec. 15, T. 1 S., R. 5 W.

A—0 to 6 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; moderate fine granular structure; slightly hard, friable, nonsticky and nonplastic; many very fine and fine roots; 5 percent rounded pebbles; neutral (pH 7.2); clear smooth boundary.

Bw—6 to 12 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 4/3) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, friable, nonsticky and nonplastic; common very fine and fine roots; 5 percent rounded pebbles; neutral (pH 7.2); gradual wavy boundary.

Bk1—12 to 18 inches; pale brown (10YR 6/3) cobbly sandy loam, brown (10YR 5/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; 20 percent rounded cobbles and 5 percent rounded pebbles; disseminated lime, many faint lime coatings on undersides of fragments; strongly effervescent; moderately alkaline (pH 8.4); gradual wavy boundary.

2Bk2—18 to 30 inches; light brownish gray (10YR 6/2) extremely cobbly loamy sand, brown (10YR 5/3) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; 35 percent rounded

cobbles and 40 percent rounded pebbles; disseminated lime, many distinct lime coatings around pebbles; violently effervescent; moderately alkaline (pH 8.4); clear smooth boundary.

2Bk3—30 to 60 inches; light brownish gray (10YR 6/2) extremely gravelly loamy sand, brown (10YR 5/3) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; 15 percent rounded cobbles and 60 percent rounded pebbles; few faint lime coatings around fragments in the upper 12 inches; violently effervescent; moderately alkaline (pH 8.4).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 12 and 35 inches

*Thickness of the mollic epipedon:* 7 to 12 inches

*Depth to Bk1 horizon:* 10 to 18 inches

*Depth to 2Bk material:* 13 to 22 inches

*Percent of surface covered by stones:* 0 to 3 percent

*A horizon:*

Hue—4 or 5 dry

Chroma—2 or 3

Texture—sandy loam or loam

Clay content—10 to 20 percent

Content of rock fragments—0 to 60 percent (0 to 25 percent cobbles, 0 to 35 percent pebbles)

Reaction—pH 6.6 to 7.8

*Bw horizon:*

Value—4, 5, or 6 dry; 3 or 4 moist

Chroma—2 or 3

Clay content—5 to 15 percent

Content of rock fragments—0 to 70 percent (0 to 30 percent cobbles, 0 to 40 percent pebbles)

Reaction—pH 6.6 to 8.4

*Bk horizon:*

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—sandy loam or loamy sand

Clay content—0 to 10 percent

Content of rock fragments—5 to 75 percent (0 to 35 percent cobbles and stones, 5 to 40 percent pebbles)

Calcium carbonate equivalent—5 to 25 percent

Reaction—pH 7.4 to 8.4

*2Bk horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—loamy sand or loamy coarse sand

Clay content—0 to 10 percent

Content of rock fragments—35 to 85 percent (0 to 35 percent cobbles and stones, 30 to 60 percent pebbles)  
 Calcium carbonate equivalent—5 to 25 percent  
 Reaction—pH 7.4 to 8.4

## Vigilante Series

*Depth class:* Deep (40 to 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, escarpments, ridges, interfluves, and side slopes of hills

*Parent material:* Local colluvium or slope alluvium deposited over hard, highly fractured shale or argillite bedrock

*Slope range:* 8 to 50 percent

*Elevation range:* 4,400 to 6,500 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 38 to 42 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Haplustolls

### Typical Pedon

Vigilante channery loam, in an area of Wilde-Deville-Vigilante complex, 8 to 35 percent slopes, in rangeland, 800 feet south and 2,675 feet west of the northeast corner of sec. 19, T. 2 N., R. 3 W.

A—0 to 7 inches; brown (7.5YR 4/2) channery loam, dark brown (7.5YR 3/2) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; 25 percent channers; slightly alkaline (pH 7.4); clear wavy boundary.

Bw1—7 to 16 inches; brown (10YR 5/3) very channery loam, brown (7.5YR 4/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots and few medium roots; common very fine and fine pores; 5 percent flagstones and 50 percent channers; neutral (pH 7.2); gradual wavy boundary.

Bw2—16 to 34 inches; pale brown (10YR 6/3) extremely channery loam, brown (10YR 4/3) moist; weak coarse subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots and few medium roots; common medium pores; 5 percent flagstones and 65 percent channers; neutral (pH 7.0); gradual irregular boundary.

BC—34 to 46 inches; very pale brown (10YR 7/3)

extremely channery loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common fine pores; 10 percent flagstones and 70 percent channers; neutral (pH 7.0); gradual wavy boundary.

R—46 inches; hard, pale brown (10YR 6/3), highly fractured shale.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 11 inches

*Depth to bedrock:* 40 to 60 inches

*A horizon:*

Hue—7.5YR or 10YR

Value—4 or 5 dry

Chroma—2 or 3

Clay content—15 to 27 percent

Content of rock fragments—15 to 35 percent (0 to 10 percent flagstones, 15 to 25 percent channers)

Reaction—pH 6.6 to 7.8

*Bw1 horizon:*

Hue—7.5YR or 10YR

Value—5 or 6 dry; 4 or 5 moist

Chroma—2 or 3

Clay content—18 to 27 percent

Content of rock fragments—25 to 60 percent (0 to 10 percent flagstones, 25 to 50 percent channers)

Reaction—pH 6.6 to 7.8

*Bw2 horizon:*

Hue—7.5YR, 10YR, or 2.5Y

Value—5, 6, or 7 dry; 4 or 5 moist:

Chroma—2, 3, or 4

Texture—loam or sandy loam

Clay content—18 to 27 percent

Content of rock fragments—35 to 75 percent (0 to 10 percent flagstones, 35 to 65 percent channers)

Reaction—pH 6.6 to 7.8

*BC horizon:*

Hue—7.5YR, 10YR, or 2.5Y

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—loam or sandy loam

Clay content—10 to 15 percent

Content of rock fragments—35 to 85 percent (5 to 15 percent flagstones, 30 to 70 percent channers)

Reaction—pH 6.6 to 7.8

## Villy Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Poorly drained

*Permeability:* Moderately slow (0.2 to 0.6 inch per hour)

*Landform:* Flood plains, flood-plain steps, and drainageways

*Parent material:* Alluvium

*Slope range:* 0 to 2 percent

*Elevation range:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine-silty, mixed, superactive, calcareous, frigid Typic Fluvaquents

### Typical Pedon

Villy silt loam, 0 to 2 percent slopes, in pasture; 2,500 feet south and 1,300 feet west of the northeast corner of sec. 4, T. 10 N., R. 3 W., Lewis and Clark County, Montana:

A—0 to 2 inches; dark grayish brown (10YR 3/2) silt loam, gray (10YR 6/1) dry; moderate thin platy structure; slightly hard, very friable, slightly sticky and nonplastic; disseminated lime; violently effervescent; moderately alkaline; gradual smooth boundary.

Bg1—2 to 9 inches; dark gray (10YR 4/1) silt loam, gray (10YR 6/1) dry; moderate thin platy structure parting to moderate very fine and fine granular; slightly hard, friable, sticky and slightly plastic; many very fine roots; many very fine tubular and interstitial pores; disseminated lime; violently effervescent; moderately alkaline; gradual smooth boundary.

Bg2—9 to 28 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate medium and coarse subangular blocky structure parting to moderate fine granular; slightly hard, friable, sticky and slightly plastic; common fine roots; many very fine tubular and interstitial pores; few fine seams and soft masses of salt crystals; disseminated lime; violently effervescent; moderately alkaline; gradual smooth boundary.

Bkg—28 to 50 inches; dark gray (5Y 4/1) silt loam, gray (5Y 6/1) dry; common fine prominent dark brown (7.5YR 4/2) (moist) redox depletions; moderate very thin platy structure; hard, friable, sticky and plastic; common very fine roots; many

very fine tubular and interstitial pores; disseminated lime, common fine soft masses and threads of lime; strongly effervescent; moderately alkaline; gradual smooth boundary.

Cg—50 to 60 inches; dark grayish brown (2.5Y 4/2) loam, light brownish gray (2.5Y 6/2) dry; common fine prominent olive gray (5Y 4/2) (moist) redox depletions; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; slightly effervescent; moderately alkaline.

### Range in Characteristics

*Soil temperature:* 40 to 47 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Water table:* At the surface to 24 inches below the surface

*A horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 3, 4, or 5 moist

Chroma—1 or 2

Clay content—18 to 27 percent

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.9 to 8.4

*Bg horizon:*

Hue—10YR, 2.5Y, or N

Value—4, 5, or 6 dry; 3 or 4 moist

Chroma—0, 1, 2, or 3

Texture—silt loam or silty clay loam

Clay content—18 to 35 percent

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.9 to 8.4

*Cg horizon:*

Hue—10YR, 2.5Y, 5Y, or N

Value—6, 7, or 8 dry; 4, 5, or 6 moist

Chroma—0, 1, or 2

Texture—silt loam, silty clay loam, or very fine sandy loam; thin strata of loam, silt, and sandy loam

Clay content—18 to 35 percent

Redoximorphic features—7.5YR 4/2, 4/4; 5Y 4/2, 4/3

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.9 to 8.4

## Vitroff Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans, saddles, and side slopes of mountains

*Parent material:* Colluvium or slope alluvium derived from tuffaceous volcanic bedrock

*Slope range:* 4 to 60 percent

*Elevation range:* 5,500 to 7,000 feet

*Annual precipitation:* 15 to 24 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Fine-loamy, mixed, superactive Vitrandic Haplocryalfs

### Typical Pedon

Vitroff loam, in an area of Vitroff-Torpy loams, 35 to 60 percent slopes; in a forested area, 800 feet east and 450 feet north of the southwest corner of sec. 22, T. 6 N., R. 6 W.

Oi—1 inch to 0; forest litter of slightly decomposed needles, twigs, and roots.

E1—0 to 2 inches; light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common coarse, medium, fine, and very fine roots; 2 percent angular welded tuff pebbles; slightly acid (pH 6.2); clear smooth boundary.

E2—2 to 7 inches; very pale brown (10YR 7/3) loam, dark grayish brown (10YR 3/2) moist; moderate very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common coarse, medium, fine, and very fine roots; 10 percent angular welded tuff pebbles; neutral (pH 6.6); clear smooth boundary.

Bt and E—7 to 14 inches; 65 percent lamellae ( $\frac{1}{2}$  to  $\frac{5}{8}$  inch thick) of brown (10YR 4/3) gravelly clay loam, very dark grayish brown (2.5Y 3/2) moist (Bt part); 35 percent very pale brown (10YR 7/3) sandy clay loam, dark grayish brown (2.5Y 4/2) moist (E part); weak medium subangular blocky structure; hard, firm, moderately sticky and moderately plastic (Bt part); slightly hard, friable, slightly sticky and slightly plastic (E part); few coarse roots and common medium, fine, and very fine roots; few fine and common very fine pores; 5 percent angular welded tuff cobbles and 20 percent welded tuff pebbles; neutral (pH 6.8); gradual wavy boundary.

Bt—14 to 32 inches; pale brown (10YR 6/3) gravelly clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; very hard, firm, moderately sticky and moderately plastic; few medium and fine roots and common very fine roots; few fine and common very fine

pores; common faint clay films on faces of pedis and bridging sand grains; 10 percent angular welded tuff cobbles and 20 percent angular welded tuff pebbles; neutral (pH 7.2); diffuse wavy boundary.

BC—32 to 60 inches; light gray (10YR 7/2) extremely gravelly coarse sandy loam, olive brown (2.5Y 4/3) moist; massive; loose, nonsticky and nonplastic; few fine and very fine roots in the upper 2 feet; 20 percent angular welded tuff cobbles and 50 percent angular welded tuff pebbles; slightly alkaline (pH 7.4).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to lamellae:* 6 to 20 inches

*Content of volcanic glass:* More than 30 percent in the coarse silt and sand fraction of one or more horizons

*E horizon:*

Hue—10YR or 2.5Y

Value—6 or 7 dry; 3 or 4 moist

Chroma—2 or 3

Clay content—18 to 27 percent

Content of rock fragments—0 to 15 percent (0 to 5 percent angular cobbles, 0 to 10 percent pebbles)

Reaction—pH 5.6 to 7.3

*Bt and E horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry, 3 or 4 moist (Bt part); 5, 6, or 7 dry, 4 or 5 moist (E part)

Chroma—2 or 3

Texture—clay loam or sandy clay loam (Bt part); sandy clay loam or sandy loam (E part)

Clay content—20 to 35 percent (Bt part); 15 to 24 percent (E part)

Content of rock fragments—5 to 35 percent (0 to 5 percent angular cobbles, 5 to 30 percent pebbles)

Reaction—pH 6.1 to 7.3

*Bt horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—2 or 3

Texture—clay loam or sandy clay loam

Clay content—25 to 35 percent

Content of rock fragments—10 to 35 percent (0 to 10 percent angular cobbles, 10 to 25 percent pebbles)

Reaction—pH 6.1 to 7.3

**BC horizon:**

Hue—10YR or 2.5Y  
 Value—6 or 7 dry; 4 or 5 moist  
 Chroma—2, 3, or 4  
 Clay content—5 to 15 percent  
 Content of rock fragments—35 to 85 percent (5 to 20 percent angular cobbles, 30 to 65 percent pebbles)  
 Reaction—pH 6.6 to 7.8

**Walbert Series**

*Depth class:* Shallow (10 to 20 inches)  
*Drainage class:* Somewhat excessively drained  
*Permeability:* Rapid (6.0 to 20.0 inches per hour)  
*Landform:* Ridges, interfluvies, and side slopes of hills  
*Parent material:* Residuum derived from semiconsolidated, coarse grained sandstone  
*Slope range:* 2 to 35 percent  
*Elevation range:* 4,000 to 5,500 feet  
*Annual precipitation:* 10 to 14 inches  
*Annual air temperature:* 40 to 44 degrees F  
*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Mixed, frigid, shallow  
 Aridic Ustipsamments

**Typical Pedon**

Walbert coarse sandy loam, 4 to 15 percent slopes, in pasture, 1,100 feet east and 1,425 feet north of the southwest corner of sec. 21, T. 2 N., R. 1 W.

Ap—0 to 4 inches; light yellowish brown (2.5Y 6/4) coarse sandy loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many medium and fine roots; many very fine pores; disseminated lime; slightly effervescent; slightly alkaline (pH 7.6); abrupt smooth boundary.

C—4 to 16 inches; grayish brown (10YR 5/2) loamy coarse sand, grayish brown (2.5Y 5/2) moist; weak coarse prismatic structure; loose, nonsticky and nonplastic; common fine and very fine roots; disseminated lime; slightly effervescent; slightly alkaline (pH 7.4); gradual wavy boundary.

Cr—16 to 60 inches; light brownish gray (10YR 6/2), semiconsolidated, coarse grained sandstone that crushes to loamy coarse sand and coarse sand.

**Range in Characteristics**

*Soil temperature:* 42 to 46 degrees F  
*Moisture control section:* Between a depth of 12 inches and the paralithic contact  
*Depth to Cr horizon:* 10 to 20 inches

**A horizon:**

Hue—2.5Y or 10YR  
 Value—4, 5, or 6 dry; 3, 4, or 5 moist  
 Chroma—3 or 4  
 Texture—coarse sandy loam or sandy clay loam  
 Clay content—4 to 25 percent  
 Content of rock fragments—0 to 5 percent pebbles (mainly less than  $\frac{3}{8}$  inch in diameter)  
 Calcium carbonate equivalent—0 to 5 percent  
 Reaction—pH 6.6 to 7.8

**C horizon:**

Hue—2.5Y or 10YR  
 Value—5 or 6 dry; 4 or 5 moist  
 Chroma—2, 3, or 4  
 Texture—loamy coarse sand or coarse sand  
 Clay content—4 to 10 percent  
 Content of rock fragments—0 to 5 percent pebbles  
 Calcium carbonate equivalent—0 to 10 percent  
 Reaction—pH 6.6 to 7.8

**Warneke Series**

*Depth class:* Shallow (10 to 20 inches)  
*Drainage class:* Well drained  
*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)  
*Landform:* Escarpments, ridges, divides, and side slopes of hills  
*Parent material:* Slope alluvium or residuum derived from limestone  
*Slope range:* 8 to 70 percent  
*Elevation range:* 4,400 to 6,000 feet  
*Annual precipitation:* 15 to 19 inches  
*Annual air temperature:* 36 to 40 degrees F  
*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, carbonatic, frigid Lithic Calcicusteps

**Typical Pedon**

Warneke very gravelly loam, in an area of Whitecow-Warneke complex, 8 to 35 percent slopes; in a forested area, 1,800 feet north and 300 feet east of the southwest corner of sec. 3, T. 9 N., R. 3 W.

Oi— $\frac{1}{2}$  inch to 0; forest litter of partially decomposed needles, leaves, and twigs.

A—0 to 3 inches; grayish brown (10YR 5/2) very gravelly loam, dark brown (10YR 3/3) moist; moderate very fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium and coarse roots; 10 percent angular cobbles and 40 percent angular pebbles; disseminated lime,

common distinct lime coatings on undersides of fragments; strongly effervescent; slightly alkaline (pH 7.7); clear smooth boundary.

Bk1—3 to 9 inches; pale brown (10YR 6/3) extremely gravelly loam, yellowish brown (10YR 5/4) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium and coarse roots; many very fine pores; 10 percent angular cobbles and 55 percent angular pebbles; disseminated lime, continuous distinct lime casts on undersides of fragments; violently effervescent; moderately alkaline (pH 7.9); clear smooth boundary.

Bk2—9 to 12 inches; very pale brown (10YR 7/3) extremely gravelly loam, pale brown (10YR 6/3) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots and few medium and coarse roots; 10 percent angular cobbles and 65 percent angular pebbles; disseminated lime, common fine and medium threads and masses of lime, common distinct lime casts on fragments; violently effervescent; moderately alkaline (pH 8.3); clear smooth boundary.

R—12 inches; slightly fractured, light brownish gray (10YR 6/2) limestone bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the lithic contact (if it occurs at a depth of less than 12 inches)

*Depth to bedrock:* 10 to 20 inches

*Percent of surface covered by stones:* 0 to 3 percent

#### A horizon:

Hue—2.5Y or 10YR

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2 or 3

Clay content—10 to 25 percent

Content of rock fragments—35 to 80 percent (5 to 25 percent cobbles and stones, 30 to 55 percent pebbles)

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.4 to 8.4

#### Bk horizon:

Hue—2.5Y or 10YR

Value—6 or 7 dry; 5 or 6 moist

Chroma—2, 3, or 4

Clay content—10 to 25 percent

Content of rock fragments—35 to 80 percent (5 to

30 percent cobbles and stones, 30 to 65 percent pebbles)

Calcium carbonate equivalent—40 to 60 percent

Reaction—pH 7.9 to 9.0

## Warwood Family

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Alluvial fans and side slopes of mountains

*Parent material:* Slope alluvium, colluvium, and residuum derived mainly from granite

*Slope range:* 2 to 60 percent

*Elevation range:* 5,500 to 8,000 feet

*Annual precipitation:* 15 to 30 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 30 to 70 days

**Taxonomic classification:** Fine-loamy, mixed, superactive Eutric Glossocryalfs

### Typical Pedon

Warwood sandy loam, in an area of Elve-Warwood complex, 15 to 45 percent slopes, stony; in a forested area, 700 feet west and 700 feet south of the northeast corner of sec. 34, T. 9 N., R. 2 W.

Oi—1 inch to 0; forest litter of slightly decomposed needles, twigs, and leaves.

E—0 to 6 inches; light gray (2.5Y 7/2) sandy loam, dark grayish brown (2.5Y 4/2) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots and few medium roots; many very fine pores; 10 percent granite pebbles; slightly acid (pH 6.1); clear smooth boundary.

E/Bt—6 to 24 inches; 70 percent light brownish gray (2.5Y 6/2) sandy loam, dark grayish brown (2.5Y 4/2) moist (E part); 30 percent brown (10YR 5/3) sandy loam, brown (10YR 4/3) moist (Bt part); moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common fine, many very fine, and few medium and coarse roots; many very fine pores; common faint dark grayish brown (10YR 4/2) (moist) clay films bridging sand grains (Bt part); 10 percent granite pebbles; slightly acid (pH 6.1); clear wavy boundary.

Bt/E—24 to 36 inches; 80 percent brown (10YR 5/3) sandy clay loam, dark brown (10YR 3/3) moist (Bt part); 20 percent tongues of pale brown (10YR

6/3) sandy loam, brown (10YR 5/3) moist (E part); moderate fine and medium prismatic structure parting to moderate fine subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots and few medium and coarse roots; many very fine and common fine pores; common faint very dark grayish brown (10YR 3/2) (moist) clay films in pores and bridging sand grains of the Bt part; 10 percent granite pebbles; slightly acid (pH 6.5); clear wavy boundary.

Bt—36 to 60 inches; light brownish gray (2.5Y 6/2) very gravelly sandy clay loam, olive brown (2.5Y 4/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine pores; common distinct dark grayish brown (10YR 4/2) (moist) clay films on faces of pedis and bridging sand grains; 15 percent granite cobbles and 35 percent granite pebbles; slightly acid (pH 6.4).

### Range in Characteristics

*Soil temperature:* 36 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to argillic horizon:* 4 to 24 inches

*Percent of surface covered by stones/boulders:* 0 to 3 percent

*Other features:* Some pedons have a thin A horizon.

*E horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4 or 5 moist

Texture—sandy loam, loam, or sandy clay loam

Clay content—10 to 27 percent

Content of rock fragments—5 to 25 percent (0 to 10 percent cobbles, 5 to 15 percent pebbles)

Reaction—pH 5.6 to 6.5

*E/Bt horizon:*

Hue—7.5YR, 10YR, or 2.5Y

Value—5 or 6 dry (E part); 4 or 5 dry, 3 or 4 moist (Bt part)

Chroma—2 or 3

Texture—sandy loam or sandy clay loam

Clay content—10 to 30 percent

Content of rock fragments—5 to 35 percent (0 to 15 percent cobbles, 5 to 20 percent pebbles)

Reaction—pH 5.6 to 6.5

*Bt/E horizon:*

Hue—7.5YR, 10YR, or 2.5Y

Value—4 or 5 dry, 3 or 4 moist (Bt part); 5 or 6 dry, 4 or 5 moist (E part)

Chroma—2, 3, or 4

Texture (mixed)—sandy clay loam or clay loam

Clay content—25 to 35 percent

Content of rock fragments—5 to 35 percent (0 to 15 percent cobbles, 5 to 20 percent pebbles)

Reaction—pH 5.6 to 6.5

*Bt horizon:*

Hue—7.5YR, 10YR, or 2.5Y

Value—5 or 6 dry; 3 or 4 moist

Chroma—2, 3, or 4

Texture—sandy loam or sandy clay loam

Clay content—15 to 27 percent

Content of rock fragments—25 to 50 percent (0 to 15 percent cobbles, 5 to 35 percent pebbles)

Reaction—pH 6.1 to 7.3

### Watne Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderately slow (0.2 to 0.6 inch per hour)

*Landform:* Alluvial fans, knolls, interfluvies, and side slopes of hills

*Parent material:* Slope alluvium derived from limestone or argillite

*Slope range:* 2 to 15 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 95 days

**Taxonomic classification:** Fine-loamy, mixed, superactive, frigid Typic Argiustolls

### Typical Pedon

Watne loam, 2 to 8 percent slopes, in rangeland, 1,450 feet north and 350 feet west of the southeast corner of sec. 2, T. 1 N., R. 2 W.

A1—0 to 3 inches; very dark grayish brown (10YR 3/2) loam, black (10YR 2/1) moist; moderate very fine and fine granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; 5 percent rounded pebbles; neutral (pH 6.8); clear wavy boundary.

A2—3 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, black (10YR 2/1) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine and fine pores; 5 percent rounded pebbles; neutral (pH 7.0); clear wavy boundary.

Bt1—10 to 14 inches; grayish brown (10YR 5/2) silty

clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; 5 percent rounded pebbles; neutral (pH 7.0); clear wavy boundary.

Bt2—14 to 20 inches; brown (10YR 5/3) silt loam, brown (10YR 4/3) moist; moderate medium and coarse prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine pores; few faint dark grayish brown (10YR 4/2) clay films on faces of peds; 5 percent rounded pebbles; moderately alkaline (pH 8.0); gradual wavy boundary.

Bk1—20 to 31 inches; light gray (10YR 7/2) gravelly loam, light brownish gray (10YR 6/2) moist; moderate coarse prismatic structure; slightly hard, very friable, slightly sticky and nonplastic; few very fine and fine roots; common very fine and fine pores; 25 percent rounded pebbles; disseminated lime, common fine masses and threads of lime, common distinct lime coatings around pebbles; violently effervescent; moderately alkaline (pH 8.2); gradual wavy boundary.

Bk2—31 to 60 inches; very pale brown (10YR 7/3) gravelly loam, pale brown (10YR 6/3) moist; weak coarse prismatic structure; slightly hard, very friable, slightly sticky and nonplastic; few very fine roots; few very fine and fine pores; 20 percent rounded pebbles; disseminated lime, common fine masses and threads of lime, common distinct lime coatings around pebbles; violently effervescent; moderately alkaline (pH 8.4).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 10 to 15 inches

*Depth to Bt horizon:* 10 to 15 inches

*Depth to Bk horizon:* 16 to 28 inches

*A horizon:*

Hue—7.5YR, 10YR, or 2.5Y

Value—3 or 4 dry; 2 or 3 moist

Chroma—1 or 2

Texture—loam or silt loam

Clay content—15 to 27 percent

Content of rock fragments—0 to 15 percent pebbles

Reaction—pH 6.6 to 7.8

*Bt horizon:*

Hue—7.5YR, 10YR, or 2.5Y

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2 or 3

Texture—silt loam or silty clay loam

Clay content—25 to 35 percent

Content of rock fragments—0 to 15 percent pebbles

Reaction—pH 6.6 to 8.4

*Bk1 horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—loam, silt loam, or silty clay loam

Clay content—18 to 30 percent

Content of rock fragments—10 to 30 percent pebbles

Calcium carbonate equivalent—15 to 25 percent

Reaction—pH 7.4 to 8.4

*Bk2 horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—loam, silt loam, or fine sandy loam

Clay content—15 to 27 percent

Content of rock fragments—10 to 30 percent pebbles

Calcium carbonate equivalent—10 to 20 percent

Reaction—pH 7.4 to 8.4

### Wetsand Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Poorly drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour) in the upper 14 inches and rapid (6.0 to 20.0 inches per hour) below a depth of 14 inches

*Landform:* Flood plains, flood-plain steps, and drainageways

*Parent material:* Recent alluvium derived from mixed rock sources

*Slope range:* 0 to 2 percent

*Elevation range:* 3,800 to 5,500 feet

*Annual precipitation:* 10 to 16 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 80 to 115 days

**Taxonomic classification:** Fine-loamy over sandy or sandy-skeletal, mixed, superactive, calcareous, frigid Aeric Fluvaquents

### Typical Pedon

Wetsand loam, in an area of Clunton-Wetsand-

Bonebasin complex, 0 to 2 percent slopes, in rangeland, 1,000 feet south and 2,225 feet east of the northwest corner of sec. 9, T. 1 N., R. 3 W.

- A1—0 to 2 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; slightly effervescent; moderately alkaline (pH 8.2); clear smooth boundary.
- A2—2 to 5 inches; light brownish gray (10YR 6/2) loam with thin strata of silty clay loam, silt loam, and sandy loam, dark grayish brown (10YR 4/2) moist; strong fine granular structure; slightly hard, friable, moderately sticky and moderately plastic; many fine and very fine roots; disseminated lime; strongly effervescent; moderately alkaline (pH 8.4); clear smooth boundary.
- AC—5 to 10 inches; pale brown (10YR 6/3) silt loam, dark grayish brown (10YR 4/2) moist; moderate medium and thick platy structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine roots; 15 percent rounded pebbles; common fine prominent reddish brown (2.5YR 4/4) redox concentrations; disseminated lime, common faint lime coatings on undersides of fragments; strongly effervescent; strongly alkaline (pH 8.6); clear smooth boundary.
- C1—10 to 14 inches; brown (10YR 5/3) silt loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; 15 percent rounded pebbles; common fine prominent reddish brown (2.5YR 4/4) redox concentrations; disseminated lime, common distinct lime coatings on fragments; slightly effervescent; moderately alkaline (pH 8.2); clear smooth boundary.
- 2C2—14 to 60 inches; pale brown (10YR 6/3) extremely gravelly loamy sand, brown (10YR 5/3) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; 15 percent rounded cobbles and 55 percent rounded pebbles; disseminated lime, many distinct lime coatings on fragments in the upper 20 inches; slightly effervescent; moderately alkaline (pH 8.0).

#### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to 2C horizon:* 12 to 16 inches

*Depth to seasonal high water table:* 12 to 24 inches

*Note:* A saline phase is recognized.

#### A horizon:

Value—4, 5, or 6 dry; 3 or 4 moist

Chroma—1, 2, or 3

Texture—clay loam, loam, or sandy loam with thin strata of silty clay loam, silt loam, very fine sandy loam, and fine sandy loam

Clay content—6 to 35 percent

Content of rock fragments—0 to 20 percent pebbles

Electrical conductivity—0 to 4 mmhos/cm; 4 to 16 mmhos/cm in the saline phase

Sodium adsorption ratio—0 to 2; 4 to 13 in the saline phase

Calcium carbonate equivalent—0 to 5 percent; 3 to 10 percent in the saline phase

Reaction—pH 7.4 to 8.4; pH 8.5 to 9.0 in the saline phase

#### AC horizon:

Value—5 or 6 dry

Chroma—2 or 3

Texture—loam, silt loam, or sandy loam

Clay content—10 to 25 percent

Content of rock fragments—0 to 25 percent pebbles

Electrical conductivity—0 to 4 mmhos/cm; 4 to 16 mmhos/cm in the saline phase

Sodium adsorption ratio—0 to 2; 4 to 13 in the saline phase

Calcium carbonate equivalent—0 to 5 percent; 3 to 15 percent in the saline phase

Reaction—pH 7.4 to 8.4; pH 7.4 to 9.0 in the saline phase

#### C1 horizon:

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—2 or 3

Texture—sandy loam, loam, or silt loam

Clay content—5 to 20 percent

Content of rock fragments—0 to 35 percent (0 to 10 percent cobbles, 0 to 25 percent pebbles)

Electrical conductivity—0 to 4 mmhos/cm; 4 to 16 mmhos/cm in the saline phase

Sodium adsorption ratio—0 to 2; 4 to 13 in the saline phase

Calcium carbonate equivalent—0 to 5 percent; 3 to 15 percent in the saline phase

Reaction—pH 7.4 to 8.4; pH 7.4 to 9.0 in the saline phase

#### 2C2 horizon:

Value—5, 6, 7, or 8 dry; 4, 5, 6, or 7 moist

Chroma—2 or 3

Texture—loamy sand, sand, or coarse sand

Clay content—0 to 10 percent  
 Content of rock fragments—35 to 80 percent (5 to 20 percent cobbles, 30 to 60 percent pebbles)  
 Electrical conductivity—0 to 2 mmhos/cm; 2 to 8 mmhos/cm in the saline phase  
 Sodium adsorption ratio—0 to 2; 0 to 4 in the saline phase  
 Calcium carbonate equivalent—0 to 10 percent; 0 to 10 percent in the saline phase  
 Reaction—pH 7.4 to 8.4; pH 7.4 to 8.4 in the saline phase

## Whitecow Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, divides, ridges, and side slopes of hills

*Parent material:* Slope alluvium and colluvium derived from limestone

*Slope range:* 8 to 70 percent

*Elevation range:* 4,000 to 6,200 feet

*Annual precipitation:* 12 to 19 inches

*Annual air temperature:* 38 to 42 degrees F

*Frost-free period:* 80 to 110 days

**Taxonomic classification:** Loamy-skeletal, carbonatic, frigid Typic Calcustepts

### Typical Pedon

Whitecow channery loam, in an area of Whitecow-Warneke complex, 8 to 35 percent slopes; in a forested area, 400 feet east and 2,000 feet north of the southwest corner of sec. 3, T. 9 N., R. 3 W.

Oi—1 inch to 0; undecomposed forest litter of needles and twigs.

A—0 to 4 inches; grayish brown (10YR 5/2) channery loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine granular structure; soft, very friable, slightly sticky and slightly plastic; common fine and few medium roots; 25 percent channers; disseminated lime, common faint lime coatings on undersides of fragments; strongly effervescent; slightly alkaline (pH 7.7); clear smooth boundary.

Bk1—4 to 12 inches; light brownish gray (10YR 6/2) very channery loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and medium roots and few coarse roots; common fine pores; 40 percent channers and 5 percent angular cobbles;

disseminated lime, continuous faint lime crusts on undersides of rock fragments; violently effervescent; moderately alkaline (pH 8.0); clear wavy boundary.

Bk2—12 to 49 inches; light gray (2.5Y 7/2) extremely channery loam, light yellowish brown (2.5Y 6/4) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots and few medium and coarse roots; common fine pores; 60 percent channers and 15 percent angular cobbles; disseminated lime, common fine and medium threads and masses of lime, continuous prominent lime casts on rock fragments; violently effervescent; moderately alkaline (pH 8.3); gradual wavy boundary.

Bk3—49 to 60 inches; light yellowish brown (2.5Y 6/4) extremely channery loam, light olive brown (2.5Y 5/6) moist; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; few fine roots; few fine pores; 70 percent channers and 10 percent angular cobbles; disseminated lime, continuous distinct lime casts on rock fragments; violently effervescent; moderately alkaline (pH 8.0).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Percent of surface covered by stones/boulders:* 0 to 3 percent

*A horizon:*

Hue—2.5Y or 10YR

Value—4, 5, or 6 dry; 3 or 4 moist

Chroma—2 or 3

Clay content—18 to 27 percent

Content of rock fragments—15 to 60 percent (0 to 30 percent stones and cobbles, 5 to 35 percent channers)

Calcium carbonate equivalent—0 to 10 percent

Reaction—pH 7.4 to 8.4

*Bk1 and Bk2 horizons:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—loam or clay loam

Clay content—18 to 35 percent

Content of rock fragments—35 to 70 percent (0 to 30 percent stones and cobbles, 5 to 60 percent channers)

Calcium carbonate equivalent—35 to 50 percent

Reaction—pH 7.4 to 9.0

*Bk3 horizon:*

Hue—10YR or 2.5Y  
 Value—6, 7, or 8 dry; 4, 5, 6, or 7 moist  
 Chroma—2, 3, 4, or 6  
 Texture—clay loam, loam, or sandy loam  
 Clay content—18 to 35 percent  
 Content of rock fragments—60 to 90 percent) 5 to 30 percent stones and cobbles, 55 to 70 percent channers)  
 Calcium carbonate equivalent—25 to 40 percent  
 Reaction—pH 7.4 to 9.0

**Whitlash Series**

*Depth class:* Shallow (10 to 20 inches)  
*Drainage class:* Well drained  
*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)  
*Landform:* Alluvial fans, escarpments, ridges, and side slopes of hills  
*Parent material:* Residuum derived from hard sandstone or fine grained igneous rock  
*Slope range:* 2 to 70 percent  
*Elevation range:* 4,400 to 6,000 feet  
*Annual precipitation:* 15 to 19 inches  
*Annual air temperature:* 36 to 40 degrees F  
*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Lithic Haplustolls

**Typical Pedon**

Whitlash very cobbly loam, in an area of Whitlash-Whitlash, stony-Rock outcrop complex, 15 to 35 percent slopes, in rangeland, 250 feet east and 900 feet north of the southwest corner of sec. 26, T. 4 N., R. 2 W.

A—0 to 3 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; moderate medium and fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; 25 percent angular cobbles and 20 percent angular pebbles; neutral (pH 6.8); clear smooth boundary.  
 Bw—3 to 11 inches; grayish brown (10YR 5/2) extremely gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; many very fine and fine roots; slightly hard, very friable, slightly sticky and slightly plastic; 20 percent angular cobbles and 45 percent angular pebbles; neutral (pH 7.2); abrupt smooth boundary.  
 R—11 inches; hard, slightly fractured sandstone bedrock.

**Range in Characteristics**

*Soil temperature:* 38 to 42 degrees F  
*Moisture control section:* Between the depths of 4 and 12 inches or between a depth of 4 inches and the lithic contact (if it occurs at a depth of less than 12 inches)  
*Thickness of the mollic epipedon:* 7 to 10 inches  
*Depth to bedrock:* 10 to 20 inches  
*Percent of surface covered by stones/boulders:* 0 to 3 percent

*A horizon:*

Hue—7.5YR, 10YR, or 2.5Y  
 Value—3 or 4 dry; 2 or 3 moist  
 Chroma—1, 2, or 3  
 Texture—loam or coarse sandy loam  
 Clay content—5 to 27 percent  
 Content of rock fragments—15 to 60 percent (0 to 30 percent cobbles or stones, 15 to 35 percent pebbles)  
 Reaction—pH 6.1 to 7.3

*Bw horizon:*

Hue—7.5YR, 10YR, or 2.5Y  
 Value—4 or 5 dry; 3 or 4 moist  
 Chroma—2 or 3  
 Texture—loam, sandy clay loam, or sandy loam  
 Clay content—5 to 27 percent  
 Content of rock fragments—35 to 80 percent (5 to 50 percent cobbles or stones, 15 to 60 percent pebbles)  
 Reaction—pH 6.1 to 7.3

**Whitore Series**

*Depth class:* Very deep (greater than 60 inches)  
*Drainage class:* Well drained  
*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)  
*Landform:* Alluvial fans and side slopes of mountains  
*Parent material:* Slope alluvium and colluvium derived from limestone  
*Slope range:* 8 to 70 percent  
*Elevation range:* 5,500 to 7,500 feet  
*Annual precipitation:* 15 to 24 inches  
*Annual air temperature:* 36 to 40 degrees F  
*Frost-free period:* 50 to 70 days

**Taxonomic classification:** Loamy-skeletal, carbonatic Typic Eutrocryepts

**Typical Pedon**

Whitore very gravelly loam, in an area of Tropol, bouldery-Rock outcrop-Whitore, bouldery, complex, 15 to 45 percent slopes; in a forested area, 950 feet south

and 2,100 feet east of the northwest corner of sec. 2, T. 5 N., R. 2 W.

Oi—1 inch to 0; forest litter of decomposed needles, twigs, and leaves.

A—0 to 5 inches; brown (10YR 4/3) very gravelly loam, dark brown (10YR 3/3) moist; moderate medium granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots and few medium roots; 5 percent angular cobbles and 35 percent angular pebbles; disseminated lime; slightly effervescent; slightly alkaline (pH 7.5); clear wavy boundary.

Bw—5 to 12 inches; brown (10YR 5/3) very gravelly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots and few medium roots; many very fine pores; 5 percent angular cobbles and 40 percent angular pebbles; disseminated lime, common faint lime coatings on undersides of fragments; strongly effervescent; moderately alkaline (pH 7.9); clear wavy boundary.

Bk1—12 to 29 inches; light gray (10YR 7/2) very gravelly loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine, fine, medium, and coarse roots; many very fine and fine pores; 5 percent angular cobbles and 50 percent angular pebbles; disseminated lime, common distinct lime casts on surface and pendants on undersides of fragments; violently effervescent; moderately alkaline (pH 8.3); gradual irregular boundary.

Bk2—29 to 60 inches; light brownish gray (10YR 6/2) extremely gravelly loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few very fine, fine, medium, and coarse roots; common fine and very fine pores; 10 percent angular cobbles and 65 percent angular pebbles; disseminated lime, many distinct lime casts on surface and pendants on undersides of fragments; violently effervescent; moderately alkaline (pH 8.3).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bk horizon:* 5 to 15 inches

*Percent of surface covered by stones/boulders:* 0 to 3 percent

*A horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 3 or 4 moist

Chroma—1, 2, or 3

Clay content—18 to 27 percent

Content of rock fragments—15 to 45 percent (5 to 20 percent cobbles and stones, 10 to 35 percent pebbles)

Calcium carbonate equivalent—5 to 10 percent

Reaction—pH 7.4 to 8.4

*Bw horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Clay content—18 to 27 percent

Content of rock fragments—15 to 60 percent (5 to 25 percent cobbles and stones, 5 to 40 percent pebbles)

Calcium carbonate equivalent—35 to 50 percent

Reaction—pH 7.4 to 9.0

*Bk horizon:*

Hue—10YR or 2.5Y

Value—6, 7, or 8 dry; 4, 5, 6, or 7 moist

Chroma—2, 3, or 4

Clay content—18 to 27 percent

Content of rock fragments—35 to 85 percent (0 to 40 percent cobbles and stones, 25 to 65 percent pebbles)

Calcium carbonate equivalent—40 to 50 percent

Reaction—pH 7.4 to 9.0

### Wickes Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, ridges, interfluves, and side slopes of hills

*Parent material:* Local colluvium, slope alluvium, and residuum derived from hard, fine grained sandstone or fine grained igneous rock

*Slope range:* 2 to 70 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Argiustolls

### Typical Pedon

Wickes very gravelly loam, in an area of Shawmut, bouldery-Wickes, stony-Tolbert, bouldery, complex, 15 to 35 percent slopes, in rangeland, 2,200 feet south

and 1,500 feet west of the northeast corner of sec. 16, T. 9 N., R. 3 W.

A—0 to 8 inches; dark grayish brown (10YR 4/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, moderately sticky and slightly plastic; many very fine and few fine roots; many fine and very fine pores; 10 percent angular cobbles and 30 percent angular pebbles; neutral (pH 6.8); clear smooth boundary.

Bt1—8 to 15 inches; brown (10YR 5/3) very gravelly clay loam, brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, moderately sticky and moderately plastic; many very fine and few fine roots; many very fine and fine pores; common distinct brown (10YR 4/3) clay films on faces of ped and bridging sand grains; 15 percent angular cobbles and 30 percent angular pebbles; neutral (pH 6.8); clear wavy boundary.

Bt2—15 to 24 inches; light olive brown (2.5Y 5/4) very cobbly loam, olive brown (2.5Y 4/4) moist; weak very fine and fine subangular blocky structure; soft, very friable, moderately sticky and slightly plastic; many very fine and fine roots; many very fine and fine pores; few faint dark yellowish brown (10YR 4/4) clay films on faces of ped and bridging sand grains; 30 percent angular cobbles and 25 percent angular pebbles; slightly alkaline (pH 7.6); clear wavy boundary.

Bk—24 to 30 inches; light yellowish brown (2.5Y 6/4) extremely cobbly loam, olive brown (2.5Y 4/4) moist; weak very fine and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine and fine pores; 40 percent angular cobbles and 25 percent angular pebbles; disseminated lime, common fine masses of lime, common distinct lime coatings on fragments; strongly effervescent; slightly alkaline (pH 7.6); clear smooth boundary.

R—30 inches; dark gray (10YR 4/1), hard, fine grained igneous bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 8 to 10 inches

*Depth to Bt horizon:* 6 to 13 inches

*Depth to Bk horizon:* 12 to 24 inches

*Depth to bedrock:* 20 to 40 inches

*Percent of surface covered by stones/boulders:* 0.01 to 3.0 percent

### A horizon:

Hue—10YR or 2.5Y

Value—4 or 5 dry; 2 or 3 moist

Chroma—1, 2, or 3

Clay content—15 to 27 percent

Content of rock fragments—15 to 45 percent (0 to 5 percent stones, 0 to 15 percent cobbles, 15 to 30 percent pebbles)

Reaction—pH 6.1 to 7.3

### Bt horizon:

Hue—10YR or 2.5Y

Value—4 or 5

Chroma—2, 3, or 4

Texture—clay loam or loam

Clay content—23 to 30 percent

Content of rock fragments—35 to 60 percent (0 to 5 percent stones, 10 to 30 percent cobbles, 20 to 30 percent pebbles)

Reaction—pH 6.1 to 7.8

### Bk horizon:

Hue—10YR or 2.5Y

Value—5, 6, 7, or 8 dry; 4, 5, 6, or 7 moist

Chroma—2, 3, or 4

Texture—loam or sandy loam

Clay content—15 to 25 percent

Content of rock fragments—35 to 70 percent (0 to 10 percent stones, 20 to 40 percent cobbles, 15 to 30 percent pebbles)

Calcium carbonate equivalent—10 to 25 percent

Reaction—pH 7.4 to 8.4

## Wilde Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderately rapid (2.0 to 6.0 inches per hour)

*Landform:* Escarpments, ridges, and side slopes of hills

*Parent material:* Residuum, slope alluvium, and colluvium derived from hard, brown shale or argillite

*Slope range:* 4 to 70 percent

*Elevation range:* 4,400 to 6,500 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 95 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Haplustepts

### Typical Pedon

Wilde very channery loam, in an area of Deville-Wilde-

Rock outcrop complex, 25 to 60 percent slopes; in a forested area, 150 feet south and 2,740 feet west of the northeast corner of sec. 19, T. 2 N., R. 3 W.

A—0 to 5 inches; grayish brown (10YR 5/2) very channery loam, dark grayish brown (10YR 4/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and nonplastic; many fine and very fine roots; 10 percent flagstones and 30 percent channers; neutral (pH 6.6); clear wavy boundary.

Bw1—5 to 21 inches; light brownish gray (10YR 6/2) extremely channery loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many fine and very fine roots; many fine and very fine pores; 10 percent flagstones and 60 percent channers; neutral (pH 6.8); gradual irregular boundary.

Bw2—21 to 34 inches; pale brown (10YR 6/3) extremely channery loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many fine and very fine roots; many fine and very fine pores; 10 percent flagstones and 65 percent channers; neutral (pH 7.0); clear wavy boundary.

R—34 inches; brown (10YR 5/3), hard, fractured shale.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to bedrock:* 20 to 40 inches

*Percent of surface covered by stones:* 0 to 0.1 percent

#### A horizon:

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Clay content—15 to 27 percent

Content of rock fragments—25 to 50 percent (0 to 10 percent flagstones, 15 to 40 percent channers)

Reaction—pH 6.6 to 7.3

#### Bw1 horizon:

Value—5 or 6 dry; 4 or 5 moist

Chroma—2 or 3

Texture—loam or sandy loam

Clay content—15 to 27 percent

Content of rock fragments—35 to 75 percent (5 to 15 percent flagstones, 30 to 60 percent channers)

Reaction—pH 6.6 to 7.3

#### Bw2 horizon:

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—3 or 4

Texture—loam or sandy loam

Clay content—18 to 27 percent

Content of rock fragments—35 to 80 percent (5 to 15 percent flagstones, 30 to 65 percent channers)

Reaction—pH 6.6 to 7.3

## Wilspring Series

*Depth class:* Moderately deep (20 to 40 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, ridges, and side slopes of hills

*Parent material:* Local colluvium, slope alluvium, and residuum derived from hard, brown shale or argillite

*Slope range:* 2 to 35 percent

*Elevation range:* 4,400 to 6,500 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 38 to 45 degrees F

*Frost-free period:* 80 to 95 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Haplustepts

### Typical Pedon

Wilspring channery loam, in an area of Wilspring-Devilfence complex, 4 to 15 percent slopes, in rangeland, 2,300 feet north and 2,000 feet east of the southwest corner of sec. 35, T. 4 N., R. 2 W.

A—0 to 3 inches; dark grayish brown (10YR 4/2) channery loam, dark brown (10YR 3/3) moist; moderate medium granular structure; slightly hard, very friable, nonsticky and nonplastic; many fine and very fine roots; 5 percent flagstones and 20 percent channers; slightly effervescent; slightly alkaline (pH 7.8); clear wavy boundary.

Bw—3 to 7 inches; brown (10YR 5/3) channery loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; common or many fine and very fine pores; 5 percent flagstones and 20 percent channers; slightly effervescent; moderately alkaline (pH 8.0); clear wavy boundary.

Bk1—7 to 12 inches; pale brown (10YR 6/3) very channery loam, yellowish brown (10YR 5/4) moist;

moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many fine and very fine roots; common or many fine and very fine pores; 5 percent flagstones and 35 percent channers; disseminated lime, common distinct lime coatings on undersides of fragments; strongly effervescent; moderately alkaline (pH 8.3); gradual wavy boundary.

Bk2—12 to 24 inches; light gray (10YR 7/2) very channery loam, light yellowish brown (10YR 6/4) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common or many very fine roots; few or common fine and very fine pores; 5 percent flagstones and 45 percent channers; disseminated lime, few fine masses of lime, continuous distinct lime crusts on surfaces of rock fragments; violently effervescent; moderately alkaline (pH 8.4); clear smooth boundary.

R—24 inches; brown (10YR 5/3), hard, fractured shale.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bk horizon:* 7 to 10 inches

*Depth to bedrock:* 20 to 40 inches

#### *A horizon:*

Value—4 or 5 dry

Chroma—2, 3, or 4

Clay content—15 to 27 percent

Content of rock fragments—15 to 30 percent (0 to 5 percent flagstones, 15 to 25 percent channers)

Calcium carbonate equivalent—0 to 5 percent

Reaction—pH 7.4 to 8.4

#### *Bw horizon:*

Value—5 or 6 dry

Chroma—2 or 3

Clay content—15 to 27 percent

Content of rock fragments—15 to 35 percent (0 to 5 percent flagstones, 15 to 30 percent channers)

Calcium carbonate equivalent—3 to 7 percent

Reaction—pH 7.4 to 8.4

#### *Bk horizon:*

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, 4, 5, or 6

Clay content—18 to 27 percent

Content of rock fragments—35 to 80 percent (5 to

10 percent flagstones, 30 to 70 percent channers)

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.9 to 8.4

### Wimper Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Stream terraces, alluvial fans, and side slopes of hills

*Parent material:* Alluvium or colluvium derived mainly from hard, fine grained sandstone or fine grained igneous rock

*Slope range:* 2 to 60 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Haplustolls

### Typical Pedon

Wimper gravelly loam, in an area of Wimper-Wimper, stony, complex, 15 to 35 percent slopes, in rangeland, 450 feet north and 300 feet east of the southwest corner of sec. 6, T. 1 N., R. 2 W.

A—0 to 7 inches; very dark grayish brown (10YR 3/2) gravelly loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine and fine roots and few medium roots; 20 percent pebbles; neutral (pH 7.3); clear wavy boundary.

Bw—7 to 13 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine roots and few fine and medium roots; many very fine and fine pores; 20 percent pebbles; slightly alkaline (pH 7.6); clear wavy boundary.

Bk1—13 to 17 inches; brown (10YR 5/3) very gravelly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common fine roots and few fine and medium roots; many very fine and fine pores; 35 percent pebbles; disseminated lime, many faint lime coatings on undersides of fragments; strongly effervescent;

moderately alkaline (pH 8.2); clear wavy boundary.

**Bk2**—17 to 31 inches; white (10YR 8/2) very gravelly loam, grayish brown (10YR 5/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots and few fine and medium roots; many very fine and fine pores; 40 percent pebbles; disseminated lime, few very fine and fine masses and threads of lime, continuous distinct lime casts on undersides of fragments; violently effervescent; moderately alkaline (pH 8.3); gradual wavy boundary.

**Bk3**—31 to 60 inches; light gray (10YR 7/2) very gravelly loam, light brownish gray (10YR 6/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine and fine pores; 55 percent pebbles; disseminated lime, few very fine and fine masses and threads of lime, continuous faint lime coatings on undersides of fragments; violently effervescent; moderately alkaline (pH 8.3).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 15 inches

*Depth to Bk horizon:* 10 to 15 inches

*Percent of surface covered by stones:* 0 to 0.1 percent

#### *A horizon:*

Hue—7.5YR or 10YR

Value—3, 4, or 5 dry; 2 or 3 moist

Chroma—1, 2, or 3

Clay content—15 to 27 percent

Content of rock fragments—5 to 35 percent (0 to 10 percent cobbles, 15 to 35 percent pebbles)

Reaction—pH 6.6 to 7.8

#### *Bw horizon:*

Hue—7.5YR or 10YR

Value—4, 5, or 6 dry; 3, 4, or 5 moist

Chroma—2, 3, or 4

Texture—loam or silt loam

Clay content—15 to 27 percent

Content of rock fragments—15 to 50 percent (0 to 10 percent cobbles, 15 to 40 percent pebbles)

Calcium carbonate equivalent—0 to 3 percent

Reaction—pH 6.6 to 7.8

#### *Bk1 horizon:*

Hue—7.5YR, 10YR, or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2 or 3

Texture—loam or silt loam

Clay content—15 to 27 percent

Content of rock fragments—35 to 60 percent (0 to 10 percent cobbles, 35 to 50 percent pebbles)

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.9 to 8.4

#### *Bk2 horizon:*

Hue—7.5YR, 10YR, or 2.5Y

Value—6, 7, or 8 dry; 5 or 6 moist

Chroma—2 or 3

Texture—loam or silt loam

Clay content—15 to 27 percent

Content of rock fragments—35 to 60 percent (0 to 15 percent cobbles, 35 to 45 percent pebbles)

Calcium carbonate equivalent—15 to 25 percent

Reaction—pH 7.9 to 9.0

#### *Bk3 horizon:*

Hue—7.5YR, 10YR, or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2 or 3

Texture—loam or silt loam

Clay content—15 to 27 percent

Content of rock fragments—35 to 70 percent (0 to 15 percent cobbles, 35 to 55 percent pebbles)

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.9 to 9.0

## Windham Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, ridges, divides, and side slopes of hills

*Parent material:* Slope alluvium and colluvium derived from limestone

*Slope range:* 2 to 70 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 105 days

**Taxonomic classification:** Loamy-skeletal, carbonatic, frigid Typic Calciustolls

### Typical Pedon

Windham gravelly loam, in an area of Windham-Rock outcrop-Lap, very stony, complex, 8 to 35 percent slopes; in a forested area, 900 feet west and 150 feet south of the northeast corner of sec. 5, T. 1 N., R. 1 W.

**Ap**—0 to 7 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark brown (10YR 2/2) moist;

moderate fine granular structure; soft, friable, slightly sticky and slightly plastic; 5 percent limestone cobbles and 15 percent limestone pebbles; slightly effervescent; slightly alkaline (pH 7.4); clear wavy boundary.

**Bk1**—7 to 11 inches; pale brown (10YR 6/3) very gravelly loam, dark grayish brown (10YR 4/2) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; many fine and very fine pores; 10 percent limestone cobbles and 35 percent limestone pebbles; disseminated lime, continuous prominent casts and pendants on undersides of fragments; violently effervescent; moderately alkaline (pH 8.0); clear wavy boundary.

**Bk2**—11 to 25 inches; light gray (10YR 7/2) very gravelly loam, grayish brown (10YR 5/2) moist; massive; slightly hard, friable, slightly sticky and nonplastic; many fine and very fine roots; many fine and very fine pores; 10 percent limestone cobbles and 40 percent limestone pebbles; disseminated lime, common fine masses of lime, continuous prominent lime casts and pendants on undersides of fragments; violently effervescent; moderately alkaline (pH 8.2); diffuse wavy boundary.

**Bk3**—25 to 60 inches; pale brown (10YR 6/3) extremely gravelly loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and nonplastic; common fine and very fine roots; few or common fine and very fine pores; 15 percent limestone cobbles and 50 percent limestone pebbles; disseminated lime, common fine masses of lime, continuous distinct lime casts and pendants on undersides of pebbles and cobbles; violently effervescent; moderately alkaline (pH 8.2).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 12 inches

*Depth to Bk horizon:* 5 to 10 inches

*Percent of surface covered by stones/boulders:* 0 to 3 percent

*Ap horizon:*

Hue—2.5Y or 10YR

Value—4 or 5 dry; 2 or 3 moist

Chroma—1, 2, or 3

Clay content—18 to 27 percent

Content of rock fragments—15 to 60 percent (0 to

15 percent stones, 5 to 20 percent cobbles, 10 to 50 percent pebbles)

Calcium carbonate equivalent—5 to 10 percent

Reaction—pH 7.4 to 8.4

*Bk1 horizon:*

Hue—10YR or 2.5Y

Value—4, 5, or 6 dry; 3, 4, 5, or 6 moist

Chroma—2, 3, or 4

Clay content—15 to 27 percent

Content of rock fragments—10 to 75 percent (0 to 20 percent cobbles, 10 to 55 percent pebbles)

Calcium carbonate equivalent—40 to 60 percent

Reaction—pH 7.9 to 8.4

*Bk2 horizon:*

Hue—10YR or 2.5Y

Value—5, 6, 7, or 8 dry; 4, 5, 6, or 7 moist

Chroma—2, 3, or 4

Clay content—15 to 27 percent

Content of rock fragments—35 to 75 percent (0 to 20 percent cobbles, 35 to 55 percent pebbles)

Calcium carbonate equivalent—40 to 60 percent

Reaction—pH 7.9 to 8.4

*Bk3 horizon:*

Hue—7.5YR, 10YR, or 2.5Y

Value—5, 6, 7, or 8 dry; 4, 5, 6, or 7 moist

Chroma—2, 3, or 4

Texture—loam or sandy loam

Clay content—15 to 27 percent

Content of rock fragments—60 to 80 percent (5 to 20 percent cobbles, 55 to 60 percent pebbles)

Calcium carbonate equivalent—25 to 50 percent

Reaction—pH 7.9 to 9.0

### Work Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderately slow (0.2 to 0.6 inch per hour)

*Landform:* Alluvial fans, stream terraces, and side slopes of hills

*Parent material:* Alluvium and glacial outwash derived from mixed rock sources

*Slope range:* 2 to 25 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 80 to 95 days

**Taxonomic classification:** Fine, smectitic, frigid Typic Argiustolls

### Typical Pedon

Work clay loam, in an area of Martinsdale-Work complex, 2 to 8 percent slopes, in rangeland, 1,500 feet west and 2,500 feet south of the northeast corner of sec. 33, T. 5 N., R. 2 W.

- A—0 to 3 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine roots; 10 percent rounded pebbles; neutral (pH 6.6); clear smooth boundary.
- Bt—3 to 11 inches; dark grayish brown (10YR 4/2) clay, dark brown (10YR 3/3) moist; moderate medium prismatic structure parting to strong medium and fine blocky; hard, firm, moderately sticky and moderately plastic; many fine and very fine roots; common fine and very fine pores; continuous faint clay films on faces of peds; 5 percent rounded pebbles; slightly alkaline (pH 7.6); clear wavy boundary.
- Btk—11 to 17 inches; grayish brown (2.5Y 5/2) clay, brown (10YR 4/3) moist; moderate medium prismatic structure parting to weak medium blocky; hard, friable, moderately sticky and moderately plastic; common fine and very fine roots; common fine and very fine pores; common faint clay films on vertical faces of peds; 5 percent rounded pebbles; disseminated lime, common fine and very fine masses of lime; strongly effervescent; moderately alkaline (pH 8.0); gradual wavy boundary.
- Bk1—17 to 32 inches; pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; moderate medium and coarse prismatic structure; hard, friable, moderately sticky and moderately plastic; few or common fine roots; many fine and very fine pores; 10 percent rounded pebbles; disseminated lime, many fine and very fine threads and masses of lime, continuous faint lime coatings on undersides of fragments; violently effervescent; moderately alkaline (pH 8.2); gradual wavy boundary.
- Bk2—32 to 43 inches; grayish brown (10YR 5/2) clay loam, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, moderately sticky and slightly plastic; few very fine roots; many fine pores; 10 percent rounded pebbles; disseminated lime, few fine masses of lime, common faint lime coatings on undersides of fragments; strongly effervescent; moderately alkaline (pH 8.2); gradual wavy boundary.
- Bk3—43 to 60 inches; brown (10YR 5/3) gravelly clay loam, dark brown (10YR 4/3) moist; massive; hard, friable, moderately sticky and moderately

plastic; 20 percent rounded pebbles; disseminated lime, common distinct lime coatings on undersides of fragments; strongly effervescent; moderately alkaline (pH 8.0).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Thickness of the mollic epipedon:* 7 to 11 inches

*Depth to Bt horizon:* 3 to 9 inches

*Depth to Bk horizon:* 11 to 18 inches

*Percent of surface covered by stones:* 0 to 0.1 percent

#### *A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 2 or 3 moist

Chroma—2 or 3

Texture—loam, clay loam, or sandy clay loam

Clay content—20 to 35 percent

Content of rock fragments—0 to 60 percent (0 to 30 percent stones or cobbles, 0 to 30 percent pebbles)

Reaction—pH 6.1 to 7.8

#### *Bt horizon:*

Hue—7.5YR, 10YR, or 2.5Y

Value—4 or 5 dry; 2, 3, or 4 moist

Chroma—2 or 3

Texture—clay loam, clay, or silty clay

Clay content—35 to 50 percent

Content of rock fragments—0 to 15 percent (0 to 5 percent cobbles or stones, 0 to 10 percent pebbles)

Reaction—pH 6.6 to 7.8

#### *Btk horizon:*

Hue—7.5YR, 10YR, or 2.5Y

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—clay or clay loam

Clay content—30 to 40 percent

Content of rock fragments—0 to 15 percent (0 to 5 percent cobbles or stones, 0 to 10 percent pebbles)

Calcium carbonate equivalent—5 to 15 percent

Reaction—pH 7.4 to 8.4

#### *Bk horizon:*

Hue—7.5YR, 10YR, or 2.5Y

Value—5, 6, or 7 dry; 4, 5, or 6 moist

Chroma—2, 3, or 4

Texture—loam or clay loam

Clay content—20 to 35 percent

Content of rock fragments—0 to 35 percent (0 to 5 percent cobbles, 0 to 30 percent pebbles)

Calcium carbonate equivalent—3 to 10 percent  
Reaction—pH 7.4 to 8.4

## Worock Family

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderately slow (0.2 to 0.6 inch per hour)

*Landform:* Alluvial fans, valleys, and side slopes of mountains

*Parent material:* Slope alluvium, colluvium, and glacial outwash derived mainly from fine grained igneous and metamorphic rocks

*Slope range:* 2 to 60 percent

*Elevation range:* 5,500 to 8,000 feet

*Annual precipitation:* 15 to 30 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 30 to 70 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive Eutric Haplocryalfs

### Typical Pedon

Worock very cobbly loam, in an area of Worock, very bouldery-Elve, very stony, complex, 15 to 35 percent slopes; in a forested area, 1,400 feet north and 575 feet west of the southeast corner of sec. 13, T. 3 N., R. 4 W.

Oi—3 inches to 0; forest litter of partially decomposed needles, leaves, and twigs.

E—0 to 4 inches; light brownish gray (10YR 6/2) very cobbly loam, dark grayish brown (10YR 4/2) moist; weak medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; common medium roots and many fine and very fine roots; 25 percent rounded cobbles and 15 percent rounded pebbles; neutral (pH 7.2); clear wavy boundary.

E/Bt—4 to 14 inches; 80 percent pale brown (10YR 6/3) very cobbly sandy clay loam, dark grayish brown (10YR 4/2) moist (E part); 20 percent grayish brown (10YR 5/2) very cobbly sandy clay loam, dark grayish brown (10YR 4/2) moist (Bt part); moderate medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots and few medium and coarse roots; few faint clay films on faces of peds (Bt part); 25 percent rounded cobbles and 25 percent rounded pebbles; neutral (pH 7.0); clear wavy boundary.

Bt1—14 to 28 inches; brown (10YR 5/3) very cobbly sandy clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly

plastic; common fine and very fine roots and few medium and coarse roots; common very fine pores; many distinct clay films on faces of peds and bridging sand grains; 30 percent rounded cobbles and 25 percent rounded pebbles; neutral (pH 7.3); gradual wavy boundary.

Bt2—28 to 49 inches; brown (10YR 5/3) very cobbly sandy clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots and few medium and coarse roots; common very fine pores; many distinct clay films on faces of peds and bridging sand grains; 30 percent rounded cobbles and 30 percent rounded pebbles; neutral (pH 6.8); gradual wavy boundary.

BC—49 to 60 inches; yellowish brown (10YR 5/4) very cobbly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine pores; 40 percent rounded cobbles and 20 percent rounded pebbles; neutral (pH 6.6).

### Range in Characteristics

*Soil temperature:* 36 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bt horizon:* 6 to 18 inches

*Percent of surface covered by stones/boulders:* 0 to 40 percent

*E horizon:*

Hue—7.5YR or 10YR

Value—6 or 7 dry; 3, 4, or 5 moist

Chroma—2, 3, 4, or 5

Texture—loam or sandy loam

Clay content—8 to 27 percent

Content of rock fragments—10 to 65 percent (0 to 35 percent cobbles and stones, 10 to 30 percent pebbles)

Reaction—pH 5.6 to 7.3

*E/Bt horizon:*

Hue—10YR or 7.5YR

Value—6 or 7 dry, 3, 4, or 5 moist (E part); 5 or 6 dry, 4 or 5 moist (Bt part)

Chroma—2, 3, 4, 5, or 6

Texture (mixed)—loam, sandy clay loam, or clay loam

Clay content—15 to 27 percent

Content of rock fragments—20 to 60 percent (0 to 35 percent cobbles and stones, 10 to 35 percent pebbles)

Reaction—pH 5.6 to 7.3

**Bt horizon:**

Hue—2.5Y, 10YR, or 7.5YR  
 Value—5, 6, or 7 dry; 4 or 5 moist  
 Chroma—2, 3, 4, 5, or 6  
 Texture—loam, clay loam, or sandy clay loam  
 Clay content—18 to 35 percent  
 Content of rock fragments—35 to 65 percent (0 to 35 percent cobbles and stones, 25 to 45 percent pebbles)  
 Reaction—pH 5.6 to 7.3

**BC horizon:**

Hue—2.5Y, 10YR, or 7.5YR  
 Value—5, 6, or 7 dry; 4, 5, or 6 moist  
 Chroma—3, 4, or 6  
 Texture—sandy loam, loam, or sandy clay loam  
 Clay content—10 to 25 percent  
 Content of rock fragments—35 to 80 percent (5 to 40 percent cobbles and stones, 20 to 45 percent pebbles)  
 Reaction—pH 5.6 to 7.3

**Yetull Series**

*Depth class:* Very deep (greater than 60 inches)  
*Drainage class:* Somewhat excessively drained  
*Permeability:* Rapid (6.0 to 20.0 inches per hour)  
*Landform:* Alluvial fans and hills  
*Parent material:* Sandy alluvium and eolian deposits  
*Slope range:* 2 to 35 percent  
*Elevation range:* 4,200 to 5,000 feet  
*Annual precipitation:* 10 to 14 inches  
*Annual air temperature:* 40 to 44 degrees F  
*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Mixed, frigid Aridic  
 Ustipsamments

**Typical Pedon**

Yetull loamy fine sand, in an area of Yetull-Yetull, stony, complex, 8 to 35 percent slopes, in rangeland, 2,400 feet north and 1,210 feet west of the southeast corner of sec. 10, T. 3 N., R. 4 W.

A—0 to 7 inches; dark yellowish brown (10YR 4/4) loamy fine sand, very dark grayish brown (10YR 3/2) moist; single grain; soft, loose, nonsticky and nonplastic; many fine and very fine roots; neutral (pH 6.6); clear wavy boundary.

C1—7 to 27 inches; yellowish brown (10YR 5/4) loamy fine sand, dark brown (10YR 3/3) moist; single grain; loose, nonsticky and nonplastic; many fine and very fine roots and few medium roots; slightly alkaline (pH 7.4); gradual wavy boundary.

C2—27 to 60 inches; light yellowish brown (10YR 6/4) loamy fine sand, yellowish brown (10YR 5/4) moist; single grain; loose, nonsticky and nonplastic; common fine and very fine roots; slightly effervescent; slightly alkaline (pH 7.6).

**Range in Characteristics**

*Soil temperature:* 42 to 46 degrees

*Moisture control section:* Between the depths of 12 and 35 inches

*Percent of surface covered by stones:* 0 to 0.1 percent

**A horizon:**

Hue—10YR or 2.5Y  
 Value—4, 5, or 6 dry; 3 or 4 moist  
 Chroma—2, 3, or 4  
 Clay content—0 to 10 percent  
 Content of rock fragments—0 to 35 percent (0 to 10 percent cobbles, 0 to 25 percent pebbles)  
 Reaction—pH 6.6 to 7.8

**C horizon:**

Hue—10YR or 2.5Y  
 Value—4, 5, or 6 dry; 4 or 5 moist  
 Chroma—2, 3, or 4  
 Texture—loamy sand or loamy fine sand  
 Clay content—0 to 10 percent  
 Content of rock fragments—0 to 15 percent pebbles  
 Calcium carbonate equivalent—0 to 5 percent  
 Reaction—pH 7.4 to 8.4

**Ymark Series**

*Depth class:* Deep (40 to 60 inches)  
*Drainage class:* Well drained  
*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)  
*Landform:* Alluvial fans, ridges, and side slopes of hills and mountains  
*Parent material:* Colluvium derived from hard, fine grained igneous rock and granite deposited over hard granite bedrock  
*Slope range:* 15 to 60 percent  
*Elevation range:* 4,400 to 6,000 feet  
*Annual precipitation:* 15 to 19 inches  
*Annual air temperature:* 36 to 40 degrees F  
*Frost-free period:* 90 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Haplustalfs

**Typical Pedon**

Ymark very cobbly sandy loam, in an area of Ymark, very bouldery-Elmark, very bouldery-Rock outcrop

complex, 25 to 60 percent slopes; in a forested area, 500 feet north and 350 feet east of the southwest corner of sec. 3, T. 8 N., R. 4 W.

Oi—1 inch to 0; forest litter of partially decomposed needles, twigs, and leaves.

A—0 to 6 inches; dark grayish brown (10YR 4/2) very cobbly sandy loam, very dark gray (10YR 3/1) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots and few fine and medium roots; many very fine and few fine pores; 15 percent cobbles and 25 percent pebbles; neutral (pH 7.1); clear smooth boundary.

Bt1—6 to 10 inches; brown (10YR 5/3) very cobbly sandy clay loam, brown (10YR 4/3) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots and few fine and medium roots; many very fine and few fine pores; few faint clay films on faces of peds and bridging sand grains; 15 percent cobbles and 25 percent pebbles; neutral (pH 6.8); clear smooth boundary.

Bt2—10 to 22 inches; yellowish brown (10YR 5/4) very cobbly sandy clay loam, dark yellowish brown (10YR 4/4) moist; weak medium prismatic structure parting to moderate medium and fine subangular blocky; slightly hard, friable, moderately sticky and slightly plastic; many very fine roots and few fine, medium, and coarse roots; many very fine and few fine pores; many faint clay films on faces of peds and bridging sand grains; 30 percent cobbles and 20 percent pebbles; slightly acid (pH 6.2); clear wavy boundary.

Bt3—22 to 36 inches; yellowish brown (10YR 5/4) very cobbly sandy clay loam, brown (10YR 4/3) moist; moderate medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots and few fine and medium roots; many very fine and few fine pores; many faint clay films bridging sand grains; 30 percent cobbles and 20 percent pebbles; neutral (pH 6.8); clear wavy boundary.

BC—36 to 44 inches; yellowish brown (10YR 5/6) very cobbly coarse sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium and fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common very fine roots and few fine and medium roots; many very fine and few fine pores; 10 percent stones, 25 percent cobbles, and 20 percent pebbles; neutral (pH 6.9); clear wavy boundary.

Cr—44 to 58 inches; olive (5Y 5/3), decomposed granite bedrock (grus) that crushes to very gravelly loamy coarse sand.

R—58 inches; hard granite bedrock.

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bt horizon:* 6 to 12 inches

*Depth to Cr horizon:* 40 to 58 inches

*Depth to R layer:* 43 to 60 inches

*Percent of surface covered by boulders:* 0.01 to 3.0 percent

#### *A horizon:*

Hue—10YR or 2.5Y

Value—4 or 5 dry; 2 or 3 moist

Chroma—1, 2, or 3

Clay content—10 to 20 percent

Content of rock fragments—20 to 50 percent (0 to 20 percent stones and cobbles, 15 to 35 percent pebbles)

Reaction—pH 6.6 to 7.3

#### *Bt horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—sandy loam, sandy clay loam, or clay loam

Clay content—18 to 30 percent

Content of rock fragments—35 to 60 percent (5 to 30 percent stones and cobbles, 20 to 40 percent pebbles)

Reaction—pH 6.1 to 7.3

#### *BC horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, 4, or 6

Texture—loamy sand, coarse sandy loam, or sandy loam

Clay content—10 to 20 percent

Content of rock fragments—35 to 70 percent (5 to 35 percent stones and cobbles, 20 to 45 percent pebbles)

Reaction—pH 6.1 to 7.3

### Yreka Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Moderately slow (0.2 to 0.6 inch per hour)

*Landform:* Alluvial fans, ridges, and side slopes of hills and mountains

*Parent material:* Colluvium derived from mixed rock sources

*Slope range:* 15 to 70 percent

*Elevation range:* 4,400 to 6,000 feet

*Annual precipitation:* 15 to 19 inches

*Annual air temperature:* 36 to 40 degrees F

*Frost-free period:* 90 to 105 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, frigid Typic Haplustalfs

### Typical Pedon

Yreka gravelly loam, in an area of Yreka, bouldery-Hoyt, bouldery-Shaboom, very bouldery, complex, 15 to 45 percent slopes; in a forested area, 800 feet north and 400 feet west of the southeast corner of sec. 34, T. 9 N., R. 2 W.

Oi—1 inch to 0; forest litter of partially decomposed twigs and needles.

A—0 to 3 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; 15 percent granite pebbles; slightly acid (pH 6.3); clear smooth boundary.

E—3 to 12 inches; brown (10YR 5/3) gravelly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots and common medium roots; many very fine and fine pores; 5 percent cobbles and 20 percent pebbles; slightly acid (pH 6.5); clear smooth boundary.

Bt1—12 to 18 inches; pale brown (10YR 6/3) very gravelly loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, moderately sticky and slightly plastic; many very fine and fine roots and common medium and coarse roots; few faint clay films on faces of peds and bridging sand grains; 10 percent cobbles and 30 percent pebbles; slightly acid (pH 6.1); clear smooth boundary.

Bt2—18 to 30 inches; light yellowish brown (2.5Y 6/4) very gravelly clay loam, light olive brown (2.5Y 5/4) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; common very fine and fine pores; few faint clay films on faces of peds and bridging sand grains; 5 percent stones, 10 percent cobbles, and 35 percent pebbles; slightly acid (pH 6.5); gradual wavy boundary.

C—30 to 60 inches; brownish yellow (10YR 6/6) very gravelly fine sandy loam, yellowish brown (10YR

5/6) moist; massive; soft, very friable, slightly sticky and nonplastic; few very fine and fine roots; common very fine pores; 15 percent cobbles and 35 percent pebbles; slightly acid (pH 6.4).

### Range in Characteristics

*Soil temperature:* 38 to 42 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bt horizon:* 9 to 18 inches

*Percent of surface covered by stones/boulders:* 0 to 3 percent

#### A horizon:

Value—4 or 5 dry; 3 or 4 moist

Chroma—2 or 3

Texture—loam, sandy clay loam, or coarse sandy loam

Clay content—8 to 27 percent

Content of rock fragments—15 to 60 percent (5 to 25 percent cobbles and stones, 15 to 35 percent pebbles)

Reaction—pH 5.6 to 7.3

#### E horizon:

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—2 or 3

Texture—loam, sandy clay loam, or coarse sandy loam

Clay content—8 to 27 percent

Content of rock fragments—15 to 50 percent (5 to 25 percent cobbles and stones, 15 to 35 percent pebbles)

Reaction—pH 5.6 to 7.3

#### Bt horizon:

Hue—2.5Y, 10YR, or 7.5YR

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, or 4

Texture—loam, clay loam, or sandy clay loam

Clay content—25 to 35 percent

Content of rock fragments—35 to 60 percent (5 to 25 percent cobbles and stones, 30 to 35 percent pebbles)

Reaction—pH 5.6 to 7.3

#### C horizon:

Hue—2.5Y, 10YR, or 7.5YR

Value—5 or 6 dry; 4 or 5 moist

Chroma—2, 3, 4, 5, or 6

Texture—sandy clay loam, clay loam, or fine sandy loam

Clay content—18 to 30 percent

Content of rock fragments—35 to 60 percent (5 to 25 percent cobbles and stones, 30 to 35 percent pebbles)

Reaction—pH 5.6 to 7.3

## Zatony Series

*Depth class:* Very deep (greater than 60 inches)

*Drainage class:* Well drained

*Permeability:* Slow (0.06 to 0.2 inch per hour)

*Landform:* Alluvial fans, stream terraces, flood-plain steps, and drainageways

*Parent material:* Alluvium derived mainly from semiconsolidated shale

*Slope range:* 0 to 8 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Fine, mixed, superactive, frigid Aridic Haplustepts

### Typical Pedon

Zatony clay loam, 0 to 2 percent slopes, in cropland, 800 feet east and 1,650 feet south of the northwest corner of sec. 21, T. 2 N., R. 1 W.

Ap1—0 to 1 inch; light brownish gray (10YR 6/2) sandy clay loam, dark grayish brown (10YR 4/2) moist; massive; hard, firm, moderately sticky and moderately plastic; common very fine and few fine roots; many very fine vesicular pores; moderately alkaline (pH 8.2); abrupt smooth boundary.

Ap2—1 to 6 inches; light brownish gray (10YR 6/2) clay loam, dark grayish brown (10YR 4/2) moist; weak medium granular structure; slightly hard, friable, moderately sticky and moderately plastic; common very fine roots; many very fine pores; moderately alkaline (pH 8.3); gradual wavy boundary.

Bknz1—6 to 20 inches; pale brown (10YR 6/3) clay loam, brown (10YR 4/3) moist; weak medium prismatic structure; hard, friable, moderately sticky and moderately plastic; common very fine roots; many very fine pores; common medium masses and seams of soluble salts; disseminated lime, few fine threads of lime; strongly effervescent; strongly alkaline (pH 9.0); gradual irregular boundary.

Bknz2—20 to 36 inches; pale brown (10YR 6/3) clay loam, brown (10YR 4/3) moist; weak coarse prismatic structure; hard, friable, moderately sticky and moderately plastic; few very fine roots; common very fine pores; common medium masses and seams of soluble salts; disseminated

lime, few fine threads of lime; violently effervescent; very strongly alkaline (pH 9.6); gradual irregular boundary.

Bknz3—36 to 60 inches; light gray (10YR 7/2) silty clay, brown (10YR 5/3) moist; massive; hard, firm, moderately sticky and moderately plastic; many medium soft masses and seams of soluble salts; disseminated lime, few fine threads of lime; strongly effervescent; strongly alkaline (pH 8.6).

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the depths of 4 and 12 inches

*Depth to Bknz1 horizon:* 3 to 8 inches

*Note:* A wet phase is recognized. This phase has a water table at a depth of 24 to 42 inches for brief periods during spring and early summer.

*A horizon:*

Hue—10YR or 2.5Y

Value—5 or 6 dry

Chroma—2 or 3

Texture (mixed)—clay loam or silt loam

Clay content—20 to 40 percent

Calcium carbonate equivalent—0 to 5 percent

Electrical conductivity—2 to 16 mmhos/cm

Sodium adsorption ratio—4 to 20

Reaction—pH 7.4 to 9.0

*Bknz1 and Bknz2 horizons:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—2 or 3

Texture—clay loam, silty clay loam, silty clay, or clay

Clay content—35 to 45 percent

Calcium carbonate equivalent—3 to 15 percent

Electrical conductivity—16 to 32 mmhos/cm

Sodium adsorption ratio—13 to 60

Reaction—pH 7.9 to 9.6

*Bknz3 horizon:*

Hue—10YR or 2.5Y

Value—5, 6, or 7 dry; 4 or 5 moist

Chroma—2 or 3

Texture—clay loam, silty clay loam, silty clay, or clay

Clay content—28 to 45 percent

Calcium carbonate equivalent—2 to 10 percent

Electrical conductivity—16 to 32 mmhos/cm

Sodium adsorption ratio—13 to 40

Reaction—pH 7.9 to 9.0

## Zbart Series

*Depth class:* Very shallow (3 to 10 inches)

*Drainage class:* Somewhat excessively drained

*Permeability:* Moderate (0.6 inch to 2.0 inches per hour)

*Landform:* Escarpments, ridges, interfluves, and side slopes of hills

*Parent material:* Residuum derived from hard, fractured shale or argillite

*Slope range:* 4 to 70 percent

*Elevation range:* 3,800 to 5,000 feet

*Annual precipitation:* 10 to 14 inches

*Annual air temperature:* 40 to 44 degrees F

*Frost-free period:* 90 to 115 days

**Taxonomic classification:** Loamy-skeletal, mixed, superactive, nonacid, frigid Aridic Lithic Ustorthents

### Typical Pedon

Zbart very channery loam, in an area of Zbart-Rock outcrop association, 25 to 70 percent slopes, in rangeland, 50 feet south and 925 feet west of the northeast corner of sec. 36, T. 2 N., R. 3 W.

A—0 to 7 inches; dark grayish brown (2.5Y 4/2) very channery loam, dark olive gray (5Y 3/2) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky and nonplastic; common very fine and fine roots; 5 percent flagstones and 40 percent shale channers; slightly acid (pH 6.4); clear wavy boundary.

R—7 inches; gray (5Y 5/1), hard, fractured shale.

### Range in Characteristics

*Soil temperature:* 42 to 46 degrees F

*Moisture control section:* Between the surface and a depth of 7 inches

*Depth to bedrock:* 5 to 10 inches

*Note:* The A horizon is lithochromic.

*A horizon:*

Value—4 or 5 dry

Clay content—15 to 27 percent

Content of rock fragments—35 to 60 percent (0 to 15 percent flagstones, 35 to 50 percent channers)

Reaction—pH 6.1 to 7.3

## Detailed Soil Map Units

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

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. The contrasting components are listed in the map unit descriptions under the heading "additional components." A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough

observations to identify all the soils and miscellaneous areas on the landscape.

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

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit.

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, Amesha silt loam, 4 to 8 percent slopes, is a phase of the Amesha 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. Fairway-Meadowcreek complex, 0 to 2 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. Rock outcrop-Whitlash, bouldery, association, 35 to 70 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. Wetsand, Cardwell, and Clunton soils, 0 to 2 percent slopes, channeled, is an undifferentiated group in this survey area.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. The map unit Dumps, mine, is an example.

The acreage and proportionate extent of each map unit is given in the table "Acreage and Proportionate Extent of the Soils," which is at the end of the section "Formation and Classification of the Soils." Other tables (see Contents in Part II of this survey) give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

## 1—Riverwash

### Map Unit Setting

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 17 inches  
*Frost-free period:* 80 to 115 days

### Component Description

#### Riverwash

*Extent:* 85 percent of the map unit  
*Definition:* Riverwash is unstabilized sandy, silty, clayey, or gravelly sediment that is flooded, washed, and reworked frequently by rivers and creeks.

### Additional Components

Riverrun and similar soils: 4 percent of the unit  
 Wetsand and similar soils: 4 percent of the unit  
 Handke and similar soils: 3 percent of the unit

Pieriver and similar soils: 3 percent of the unit  
 Clunton and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2—Rubble land-Rock outcrop association

### Map Unit Setting

*Landscape:* Mountains, uplands, foothills  
*Elevation:* 3,800 to 7,000 feet  
*Mean annual precipitation:* 10 to 24 inches  
*Frost-free period:* 50 to 115 days

### Component Description

#### Rubble land

*Extent:* 45 percent of the map unit  
*Definition:* Rubble land consists of areas of cobbles, stones, and boulders. Commonly, it occurs at the base of mountains, hills, and escarpments, but in some areas it consists of deposits of cobbles, stones, and boulders left on mountain slopes by glaciation.

#### Rock outcrop

*Extent:* 30 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard sedimentary, metamorphic, and fine grained volcanic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

### Additional Components

Cheadle and similar soils: 5 percent of the unit  
 Elve and similar soils: 5 percent of the unit  
 Redfern and similar soils: 5 percent of the unit  
 Tigeron and similar soils: 4 percent of the unit  
 Rencot and similar soils: 3 percent of the unit  
 Shawmut and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 3—Dumps, mine

### Component Description

#### Dumps, mine

*Extent:* 100 percent of the map unit  
*Definition:* Mine dumps are piles of waste rock,

generally in the vicinity of active mining sites, or they are remnants of earlier mining activity.

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 4—Bronec, Clunton, channeled, and Amesha soils, 0 to 8 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands, river valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 16 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Bronec and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors  
*Slope:* 1 to 8 percent  
*Surface layer texture:* Very gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Sandy and gravelly, calcareous alluvium  
     Sandy and gravelly, calcareous slope alluvium  
     Sandy and gravelly, calcareous Tertiary valley fill alluvium  
     Sandy and gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.8 inches

#### Clunton and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Very poorly drained  
*Parent material:* Fine-loamy alluvium over sandy and gravelly alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* Frequent  
*Water table:* Within a depth of 60 inches  
*Ponding duration:* Brief  
*Available water capacity:* Mainly 9.7 inches

#### Amesha and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 1 to 8 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, coarse-loamy Tertiary valley fill alluvium  
     Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.3 inches

### Additional Components

Amesha, cobbly, and similar soils: 3 percent of the unit  
 Bronec, very stony, and similar soils: 3 percent of the unit  
 Sappington and similar soils: 3 percent of the unit  
 Havre and similar soils: 2 percent of the unit  
 Meadowcreek and similar soils: 2 percent of the unit  
 Wetsand and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 5—Borrow areas and gravel pits

### Component Description

#### Borrow areas

*Extent:* 50 percent of the map unit  
*Definition:* Borrow areas are pits or linear excavations created primarily for the purpose of extracting materials for road building.

#### Gravel pits

*Extent:* 50 percent of the map unit  
*Definition:* Gravel pits are pits or linear excavations made primarily for the purpose of obtaining gravel for road building.

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 6—Wetsand, Cardwell, and Clunton soils, 0 to 2 percent slopes, channeled

### Map Unit Setting

*Landscape:* River valleys, valleys

*Elevation:* 3,800 to 5,500 feet

*Mean annual precipitation:* 10 to 17 inches

*Frost-free period:* 80 to 115 days

### Component Description

#### Wetsand and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Drainageways, flood plains, flood-plain steps

*Slope:* 0 to 2 percent

*Surface layer texture:* Gravelly sandy loam

*Restrictive feature:* None noted

*Drainage class:* Poorly drained

*Parent material:* Loamy alluvium over sandy and gravelly recent alluvium derived from mixed igneous, sedimentary, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* Frequent

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 2.9 inches

#### Cardwell and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Flood plains, flood-plain steps

*Slope:* 0 to 2 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Somewhat poorly drained

*Parent material:* Fine-silty alluvium over sandy and gravelly alluvium

*Native plant cover type:* Rangeland

*Frequency of flooding:* Frequent

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 5.8 inches

#### Clunton and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Flood plains, flood-plain steps

*Slope:* 0 to 2 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Very poorly drained

*Parent material:* Fine-loamy alluvium over sandy and gravelly alluvium

*Native plant cover type:* Rangeland

*Frequency of flooding:* Frequent

*Water table:* Within a depth of 60 inches

*Ponding duration:* Brief

*Available water capacity:* Mainly 9.7 inches

### Additional Components

Riverrun and similar soils: 4 percent of the unit

Pieriver and similar soils: 3 percent of the unit

Wetsand loam and similar soils: 2 percent of the unit

Handke and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 9—Bronec, Riverrun, channeled, and Amesha soils, 0 to 8 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands, river valleys

*Elevation:* 3,800 to 5,500 feet

*Mean annual precipitation:* 10 to 17 inches

*Frost-free period:* 80 to 115 days

### Component Description

#### Bronec and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 1 to 8 percent

*Surface layer texture:* Very gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.8 inches

#### Riverrun and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Drainageways, flood plains, flood-plain steps

*Slope:* 0 to 2 percent

*Surface layer texture:* Gravelly sandy loam

*Restrictive feature:* None noted

*Drainage class:* Moderately well drained

*Parent material:* Sandy and gravelly recent alluvium derived from mixed igneous, sedimentary, and metamorphic rocks

*Native plant cover type:* Rangeland

*Frequency of flooding:* Occasional  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 2.1 inches

### **Amesha and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 1 to 8 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, coarse-loamy Tertiary valley fill alluvium  
     Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.3 inches

### **Additional Components**

Bronec, very stony, and similar soils: 4 percent of the unit  
 Amesha soils that have slopes of more than 8 percent: 3 percent of the unit  
 Pieriver and similar soils: 3 percent of the unit  
 Vendome and similar soils: 3 percent of the unit  
 Redfist and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **11B—Amesha silt loam, 1 to 4 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Amesha and similar soils**

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 1 to 4 percent  
*Surface layer texture:* Silt loam  
*Restrictive feature:* None noted

*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, coarse-loamy Tertiary valley fill alluvium  
     Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.1 inches

### **Additional Components**

Anamac and similar soils: 3 percent of the unit  
 Musselshell and similar soils: 3 percent of the unit  
 Brocko and similar soils: 2 percent of the unit  
 Bronec and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **11C—Amesha silt loam, 4 to 8 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Amesha and similar soils**

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 4 to 8 percent  
*Surface layer texture:* Silt loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, coarse-loamy Tertiary valley fill alluvium  
     Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.1 inches

### **Additional Components**

Bronec and similar soils: 3 percent of the unit  
 Delpoint and similar soils: 3 percent of the unit  
 Sappington and similar soils: 2 percent of the unit  
 Amesha soils that have slopes of more than 8 percent: 1 percent of the unit  
 Brocko and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 11D—Amesha silt loam, 8 to 15 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Amesha and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Silt loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, coarse-loamy Tertiary valley fill alluvium  
     Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.1 inches

### Additional Components

Amesha soils that have slopes of more than 15 percent: 3 percent of the unit  
 Bronec and similar soils: 3 percent of the unit  
 Brocko and similar soils: 2 percent of the unit  
 Kalsted and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 13A—Anamac loam, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands, river valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Anamac and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, fine-loamy alluvium or Tertiary valley fill  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.8 inches

### Additional Components

Anamac soils that have slopes of more than 2 percent: 2 percent of the unit  
 Brocko and similar soils: 2 percent of the unit  
 Cozberg and similar soils: 2 percent of the unit  
 Floweree and similar soils: 2 percent of the unit  
 Trudau and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 13C—Anamac loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Anamac and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, fine-loamy alluvium or Tertiary valley fill  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.8 inches

### Additional Components

Bronec and similar soils: 3 percent of the unit

Amesha and similar soils: 2 percent of the unit  
 Anamac, cobbly, and similar soils: 2 percent of the unit  
 Sixbeacon and similar soils: 2 percent of the unit  
 Brocko and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 18A—Brocko silt loam, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Brocko and similar soils

*Extent:* 95 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, ridges  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Silt loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Coarse-silty, calcareous alluvium  
 Coarse-silty, calcareous loess

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 11.8 inches

### Additional Components

Brocko soils that have slopes of more than 2 percent:  
 3 percent of the unit  
 Amesha and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 18C—Brocko silt loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Brocko and similar soils

*Extent:* 95 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, ridges  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Silt loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Coarse-silty, calcareous alluvium  
 Coarse-silty, calcareous loess

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 11.8 inches

### Additional Components

Bronec and similar soils: 2 percent of the unit  
 Brocko soils that have slopes of more than 8 percent:  
 1 percent of the unit  
 Cabbart and similar soils: 1 percent of the unit  
 Kalsted and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 18D—Brocko silt loam, 8 to 15 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Brocko and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, ridges  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Silt loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Coarse-silty, calcareous alluvium  
 Coarse-silty, calcareous loess

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 11.8 inches

### Additional Components

Bronec and similar soils: 4 percent of the unit  
Amesha and similar soils: 3 percent of the unit  
Rencot and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 18E—Brocko silt loam, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Brocko and similar soils

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Silt loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
Coarse-silty, calcareous alluvium  
Coarse-silty, calcareous loess  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 11.8 inches

### Additional Components

Bronec and similar soils: 5 percent of the unit  
Amesha and similar soils: 4 percent of the unit  
Crago and similar soils: 2 percent of the unit  
Rencot and similar soils: 2 percent of the unit  
Rock outcrop: 1 percent of the unit  
Zbart and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 20C—Windham gravelly loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

### Component Description

#### Windham and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly colluvium derived from limestone  
Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.1 inches

### Additional Components

Maiden and similar soils: 4 percent of the unit  
Judell and similar soils: 3 percent of the unit  
Lap and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 20D—Windham gravelly loam, 8 to 15 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,000 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Windham and similar soils

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly colluvium derived from limestone  
Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.1 inches

### Additional Components

Maiden and similar soils: 4 percent of the unit  
 Judell and similar soils: 3 percent of the unit  
 Lap and similar soils: 3 percent of the unit  
 Rock outcrop: 3 percent of the unit  
 Wimper and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 20E—Windham very gravelly loam, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

### Component Description

#### Windham and similar soils

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from limestone  
     Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.9 inches

### Additional Components

Maiden and similar soils: 4 percent of the unit  
 Judell and similar soils: 3 percent of the unit  
 Wimper and similar soils: 3 percent of the unit  
 Windham, gravelly, and similar soils: 3 percent of the unit  
 Rock outcrop: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 21A—Mckenton silty clay loam, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 16 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Mckenton and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Silty clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Very poorly drained  
*Parent material:* Saline and sodic, clayey recent alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Salinity:* Saline within a depth of 30 inches  
*Sodicity:* Sodic within a depth of 30 inches  
*Available water capacity:* Mainly 6.3 inches

### Additional Components

Bonebasin and similar soils: 2 percent of the unit  
 Clunton and similar soils: 2 percent of the unit  
 Fairway and similar soils: 2 percent of the unit  
 Meadowcreek and similar soils: 2 percent of the unit  
 Wetsand and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 22C—Zatony clay loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands, river valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Zatony and similar soils

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, drainageways, flood-plain steps, terraces

*Slope:* 2 to 8 percent

*Surface layer texture:* Clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Saline and sodic, clayey alluvium derived from shale-siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Salinity:* Saline within a depth of 30 inches

*Sodicity:* Sodic within a depth of 30 inches

*Available water capacity:* Mainly 4.4 inches

### Additional Components

Ethridge and similar soils: 4 percent of the unit

Kobarter and similar soils: 4 percent of the unit

Trudau and similar soils: 4 percent of the unit

Floweree and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 23A—Mckenton silt loam, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* River valleys, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 16 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Mckenton and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Drainageways, flood plains, flood-plain steps

*Slope:* 0 to 2 percent

*Surface layer texture:* Silt loam

*Restrictive feature:* None noted

*Drainage class:* Very poorly drained

*Parent material:* Saline and sodic, clayey recent alluvium

*Native plant cover type:* Rangeland

*Frequency of flooding:* Occasional

*Water table:* Within a depth of 60 inches

*Ponding duration:* Brief

*Salinity:* Saline within a depth of 30 inches

*Sodicity:* Sodic within a depth of 30 inches

*Available water capacity:* Mainly 6.4 inches

### Additional Components

Bonebasin and similar soils: 2 percent of the unit

Clunton and similar soils: 2 percent of the unit

Fairway and similar soils: 2 percent of the unit

Meadowcreek and similar soils: 2 percent of the unit

Wetsand and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 25C—Cozberg sandy loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Cozberg and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, terraces, valley floors

*Slope:* 2 to 8 percent

*Surface layer texture:* Sandy loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Coarse-loamy alluvium over sandy and gravelly Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.7 inches

### Additional Components

Brocko and similar soils: 4 percent of the unit

Anamac and similar soils: 2 percent of the unit

Chinook and similar soils: 2 percent of the unit

Floweree and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 26C—Crago gravelly loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,500 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Crago and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains

*Slope:* 2 to 8 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly alluvium derived from limestone

Calcareous, gravelly colluvium derived from limestone

Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.3 inches

#### Additional Components

Amesha and similar soils: 2 percent of the unit

Brocko and similar soils: 2 percent of the unit

Bronec and similar soils: 2 percent of the unit

Kalsted and similar soils: 2 percent of the unit

Musselshell and similar soils: 2 percent of the unit

#### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 26D—Crago gravelly loam, 8 to 15 percent slopes

#### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,500 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

#### Component Description

#### Crago and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains

*Slope:* 8 to 15 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly alluvium derived from limestone

Calcareous, gravelly colluvium derived from limestone

Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.3 inches

#### Additional Components

Amesha and similar soils: 2 percent of the unit

Brocko and similar soils: 2 percent of the unit

Bronec and similar soils: 2 percent of the unit

Kalsted and similar soils: 2 percent of the unit

Musselshell and similar soils: 2 percent of the unit

#### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 26E—Crago gravelly loam, 15 to 25 percent slopes

#### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,500 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

#### Component Description

#### Crago and similar soils

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains

*Slope:* 15 to 25 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly alluvium derived from limestone

Calcareous, gravelly colluvium derived from limestone

Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.3 inches

#### Additional Components

Musselshell and similar soils: 5 percent of the unit

Bronec and similar soils: 4 percent of the unit

Amesha and similar soils: 2 percent of the unit

Brocko and similar soils: 2 percent of the unit  
Kalsted and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 27A—Bronec gravelly loam, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Bronec and similar soils

*Extent:* 95 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
Sandy and gravelly, calcareous alluvium  
Sandy and gravelly, calcareous slope alluvium  
Sandy and gravelly, calcareous Tertiary valley fill alluvium  
Sandy and gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 6.3 inches

### Additional Components

Bronec, stony, and similar soils: 3 percent of the unit  
Amesha and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 27C—Bronec gravelly loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Bronec and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
Sandy and gravelly, calcareous alluvium  
Sandy and gravelly, calcareous slope alluvium  
Sandy and gravelly, calcareous Tertiary valley fill alluvium  
Sandy and gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 6.3 inches

### Additional Components

Amesha and similar soils: 3 percent of the unit  
Bronec, very stony, and similar soils: 3 percent of the unit  
Bronec, cobbly, and similar soils: 2 percent of the unit  
Geohrock and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 27D—Bronec gravelly loam, 8 to 15 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Bronec and similar soils

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium  
Sandy and gravelly, calcareous Tertiary valley fill  
alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.3 inches

### Additional Components

Amesha and similar soils: 6 percent of the unit

Geohrock and similar soils: 4 percent of the unit

Sappington and similar soils: 3 percent of the unit

Bronec, very stony, and similar soils: 2 percent of the  
unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 27E—Bronec gravelly loam, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Bronec and similar soils

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 15 to 35 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill  
alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.3 inches

### Additional Components

Amesha and similar soils: 6 percent of the unit

Sappington and similar soils: 4 percent of the unit

Geohrock and similar soils: 3 percent of the unit

Bronec, very stony, and similar soils: 2 percent of the  
unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 30A—Dougcliff mucky peat, 0 to 1 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains, river valleys, valleys

*Elevation:* 3,800 to 6,500 feet

*Mean annual precipitation:* 10 to 19 inches

*Frost-free period:* 80 to 115 days

### Component Description

#### Dougcliff and similar soils

*Extent:* 85 percent of the map unit

*Geomorphic position:* Drainageways, flood plains, flood-plain steps, swales on terraces

*Slope:* 0 to 1 percent

*Surface layer texture:* Mucky peat

*Restrictive feature:* None noted

*Drainage class:* Very poorly drained

*Parent material:* Organic, herbaceous material over fine-silty alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Water table:* Within a depth of 60 inches

*Ponding duration:* Brief

*Available water capacity:* Mainly 20.7 inches

### Additional Components

Clunton and similar soils: 5 percent of the unit

Meadowcreek and similar soils: 4 percent of the unit

Fairway and similar soils: 3 percent of the unit

Riverrun and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 32A—Fairway silt loam, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* Valleys, river valleys, uplands

*Elevation:* 3,800 to 5,500 feet

*Mean annual precipitation:* 10 to 17 inches

*Frost-free period:* 80 to 115 days

### Component Description

#### Fairway and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Flood plains, flood-plain steps, terraces  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Silt loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-loamy alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 10.6 inches

#### Additional Components

Meadowcreek and similar soils: 3 percent of the unit  
 Clunton and similar soils: 2 percent of the unit  
 Faith and similar soils: 2 percent of the unit  
 Riverrun and similar soils: 2 percent of the unit  
 Handke and similar soils: 1 percent of the unit

#### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 33E—Geohrock cobbly clay loam, 15 to 35 percent slopes, stony

#### Map Unit Setting

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,200 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

#### Component Description

#### Geohrock and similar soils

*Extent:* 80 percent of the map unit  
*Geomorphic position:* Alluvial fans, terraces, valley floors  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Cobbly clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly Tertiary valley fill alluvium  
     Gravelly slope alluvium  
*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.6 inches

#### Additional Components

Bronc and similar soils: 4 percent  
 Lahood and similar soils: 4 percent  
 Rencot and similar soils: 4 percent  
 Rock outcrop: 3 percent  
 Sappington and similar soils: 3 percent  
 Varney and similar soils: 2 percent

#### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 37A—Pieriver silt loam, 0 to 2 percent slopes

#### Map Unit Setting

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

#### Component Description

#### Pieriver and similar soils

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Silt loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-loamy recent alluvium derived from mixed rock sources  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 9.5 inches

#### Additional Components

Cardwell and similar soils: 3 percent of the unit  
 Handke and similar soils: 3 percent of the unit  
 Riverrun and similar soils: 3 percent of the unit  
 Fairway and similar soils: 2 percent of the unit  
 Nestley and similar soils: 2 percent of the unit  
 Wetsand and similar soils: 2 percent of the unit

#### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**38C—Kalsted sandy loam, 2 to 8 percent slopes****Map Unit Setting**

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

**Component Description****Kalsted and similar soils**

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Calcareous, coarse-loamy Tertiary valley fill alluvium  
 Calcareous, coarse-loamy alluvium  
 Calcareous, coarse-loamy colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.9 inches

**Additional Components**

Amesha and similar soils: 2 percent of the unit  
 Cozberg and similar soils: 2 percent of the unit  
 Crago and similar soils: 2 percent of the unit  
 Kalsted and similar soils: 2 percent of the unit  
 Roto and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**38D—Kalsted sandy loam, 8 to 15 percent slopes****Map Unit Setting**

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

**Component Description****Kalsted and similar soils**

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges, terraces  
*Slope:* 8 to 15 percent

*Surface layer texture:* Sandy loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, coarse-loamy alluvium

Calcareous, coarse-loamy colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.9 inches

**Additional Components**

Amesha and similar soils: 4 percent of the unit  
 Cozberg and similar soils: 3 percent of the unit  
 Bronec and similar soils: 2 percent of the unit  
 Crago and similar soils: 2 percent of the unit  
 Kalsted, stony, and similar soils: 2 percent of the unit  
 Roto and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**40A—Moltoner loam, 0 to 2 percent slopes****Map Unit Setting**

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,400 feet  
*Mean annual precipitation:* 10 to 16 inches  
*Frost-free period:* 90 to 115 days

**Component Description****Moltoner and similar soils**

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Poorly drained  
*Parent material:* Saline and sodic, fine-loamy, stratified recent alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Salinity:* Saline within a depth of 30 inches  
*Sodicity:* Sodic within a depth of 30 inches  
*Available water capacity:* Mainly 6.6 inches

**Additional Components**

Cardwell and similar soils: 3 percent of the unit

Ledger and similar soils: 3 percent of the unit  
 Clunton and similar soils: 2 percent of the unit  
 Wetsand and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 41—Bronec, Amesha, and Riverrun, channeled, soils, 0 to 35 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands, river valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Bronec and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors  
*Slope:* 1 to 35 percent  
*Surface layer texture:* Very gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Sandy and gravelly, calcareous alluvium  
     Sandy and gravelly, calcareous slope alluvium  
     Sandy and gravelly, calcareous Tertiary valley fill alluvium  
     Sandy and gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.8 inches

#### Amesha and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 1 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, coarse-loamy Tertiary valley fill alluvium  
     Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.3 inches

#### Riverrun and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Gravelly sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Moderately well drained  
*Parent material:* Sandy and gravelly recent alluvium derived from mixed igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Occasional  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 2.1 inches

### Additional Components

Bronec, very stony, and similar soils: 5 percent of the unit  
 Amesha, cobbly, and similar soils: 4 percent of the unit  
 Geohrock and similar soils: 4 percent of the unit  
 Sappington and similar soils: 4 percent of the unit  
 Wetsand and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 42D—Perma cobbly loam, 4 to 15 percent slopes, stony

### Map Unit Setting

*Landscape:* Uplands, foothills  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Perma and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
     Gravelly colluvium derived from basalt  
     Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt  
Gravelly slope alluvium derived from  
metavolcanics

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.4 inches

#### **Additional Components**

Wimper and similar soils: 4 percent of the unit

Hilger and similar soils: 3 percent of the unit

Shawmut and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **42E—Perma cobbly loam, 15 to 25 percent slopes, stony**

#### **Map Unit Setting**

*Landscape:* Uplands, foothills

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Perma and similar soils**

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges

*Slope:* 15 to 25 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.4 inches

#### **Additional Components**

Shawmut and similar soils: 5 percent of the unit

Blaincreek and similar soils: 4 percent of the unit

Hilger and similar soils: 3 percent of the unit

Rock outcrop: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **47A—Cardwell silty clay loam, 0 to 2 percent slopes**

#### **Map Unit Setting**

*Landscape:* River valleys, valleys

*Elevation:* 3,800 to 6,000 feet

*Mean annual precipitation:* 10 to 19 inches

*Frost-free period:* 80 to 115 days

#### **Component Description**

##### **Cardwell and similar soils**

*Extent:* 90 percent of the map unit

*Geomorphic position:* Flood plains, flood-plain steps

*Slope:* 0 to 2 percent

*Surface layer texture:* Silty clay loam

*Restrictive feature:* None noted

*Drainage class:* Somewhat poorly drained

*Parent material:* Fine-silty alluvium over sandy and gravelly alluvium

*Native plant cover type:* Rangeland

*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 6.0 inches

#### **Additional Components**

Pieriver and similar soils: 4 percent of the unit

Eagleton and similar soils: 3 percent of the unit

Nestley and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **48A—Riverrun sandy loam, 0 to 2 percent slopes**

#### **Map Unit Setting**

*Landscape:* River valleys, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 16 inches

*Frost-free period:* 90 to 115 days

#### **Component Description**

##### **Riverrun and similar soils**

*Extent:* 85 percent of the map unit

*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Moderately well drained  
*Parent material:* Sandy and gravelly recent alluvium derived from mixed igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Occasional  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 2.2 inches

### Additional Components

Clunton and similar soils: 4 percent of the unit  
 Pieriver and similar soils: 4 percent of the unit  
 Riverwash: 3 percent of the unit  
 Handke and similar soils: 2 percent of the unit  
 Meadowcreek and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 52A—Ryell loam, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Ryell and similar soils

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Coarse-loamy over sandy and gravelly recent alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 5.7 inches

### Additional Components

Havre and similar soils: 3 percent of the unit  
 Pieriver and similar soils: 3 percent of the unit

Riverrun and similar soils: 3 percent of the unit  
 Cardwell and similar soils: 2 percent of the unit  
 Fairway and similar soils: 2 percent of the unit  
 Nestley and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 53C—Sappington gravelly clay loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,200 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Sappington and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Gravelly clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, coarse-loamy Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 7.9 inches

### Additional Components

Amesha and similar soils: 3 percent of the unit  
 Sappington soils that have slopes of more than 8 percent: 3 percent of the unit  
 Geohrock and similar soils: 2 percent of the unit  
 Varney and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 56A—Trudau loam, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* River valleys, valleys, uplands  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Trudau and similar soils

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, flood-plain steps, knolls, stream terraces, terraces  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Saline and sodic, fine-loamy alluvium derived from shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Salinity:* Saline within a depth of 30 inches  
*Sodicity:* Sodic within a depth of 30 inches  
*Available water capacity:* Mainly 6.0 inches

#### Additional Components

Trudau clay loam and similar soils: 5 percent of the unit  
 Bronec and similar soils: 4 percent of the unit  
 Chinook and similar soils: 3 percent of the unit  
 Zatory and similar soils: 3 percent of the unit

#### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 56B—Trudau loam, 2 to 8 percent slopes

#### Map Unit Setting

*Landscape:* River valleys, valleys, uplands  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

#### Component Description

#### Trudau and similar soils

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, flood-plain steps, knolls, stream terraces, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Saline and sodic, fine-loamy alluvium derived from shale  
*Native plant cover type:* Rangeland  
*Flooding:* None

*Salinity:* Saline within a depth of 30 inches  
*Sodicity:* Sodic within a depth of 30 inches  
*Available water capacity:* Mainly 6.0 inches

#### Additional Components

Trudau clay loam and similar soils: 5 percent of the unit  
 Bronec and similar soils: 3 percent of the unit  
 Zatory and similar soils: 3 percent of the unit  
 Abor and similar soils: 2 percent of the unit  
 Chinook and similar soils: 2 percent of the unit

#### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 60C—Watne loam, 2 to 8 percent slopes

#### Map Unit Setting

*Landscape:* Uplands, foothills  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

#### Component Description

#### Watne and similar soils

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, interfluves, knolls  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Fine-loamy slope alluvium derived from claystone  
     Fine-loamy slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.3 inches

#### Additional Components

Watne soils that have slopes of more than 8 percent: 5 percent of the unit  
 Martinsdale and similar soils: 4 percent of the unit  
 Shawmut and similar soils: 3 percent of the unit  
 Wimper and similar soils: 3 percent of the unit

#### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 64A—Varney sandy clay loam, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Varney and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, terraces

*Slope:* 0 to 2 percent

*Surface layer texture:* Sandy clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy slope alluvium derived from fine and coarse grained igneous rocks

Fine-loamy slope alluvium derived from semiconsolidated sandstone, siltstone, and shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 7.0 inches

### Additional Components

Attewan and similar soils: 4 percent of the unit

Sappington and similar soils: 4 percent of the unit

Geohrock and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 64C—Varney sandy clay loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Varney and similar soils

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, terraces

*Slope:* 2 to 8 percent

*Surface layer texture:* Sandy clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy slope alluvium derived from fine and coarse grained igneous rocks

Fine-loamy slope alluvium derived from semiconsolidated sandstone, siltstone, and shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 7.0 inches

### Additional Components

Anamac and similar soils: 4 percent of the unit

Raghorn and similar soils: 4 percent of the unit

Sieben and similar soils: 3 percent of the unit

Abor and similar soils: 2 percent of the unit

Udecide and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 65C—Judell loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

### Component Description

#### Judell and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 2 to 8 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from limestone

Fine-loamy slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 9.6 inches

### Additional Components

Windham and similar soils: 5 percent of the unit

Maiden and similar soils: 3 percent of the unit

Lap and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 68D—Bondoe channery loam, 4 to 15 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Bondoe and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Channery loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly alluvium derived from calcareous shale  
     Gravelly colluvium derived from clayey shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 6.8 inches

### Additional Components

Benz and similar soils: 2 percent of the unit  
 Brocko and similar soils: 2 percent of the unit  
 Ethridge and similar soils: 2 percent of the unit  
 Rock outcrop: 2 percent of the unit  
 Zbart and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 69A—Meadowcreek silty clay loam, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 16 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Meadowcreek and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Drainageways, flood plains, flood-plain steps, terraces

*Slope:* 0 to 2 percent

*Surface layer texture:* Silty clay loam

*Restrictive feature:* None noted

*Drainage class:* Somewhat poorly drained

*Parent material:* Fine-loamy alluvium over sandy and gravelly alluvium

*Native plant cover type:* Rangeland

*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 6.3 inches

### Additional Components

Clunton and similar soils: 3 percent of the unit  
 Mckenton and similar soils: 3 percent of the unit  
 Bonebasin and similar soils: 2 percent of the unit  
 Wetsand and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 71C—Raghorn sandy loam, 4 to 8 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,200 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Raghorn and similar soils

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls  
*Slope:* 4 to 8 percent  
*Surface layer texture:* Sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Fine-loamy alluvium over sandy alluvium derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 6.1 inches

### Additional Components

Varney and similar soils: 5 percent of the unit  
 Bronec and similar soils: 4 percent of the unit  
 Cozberg and similar soils: 3 percent of the unit  
 Yetull and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 71D—Raghorn sandy loam, 8 to 15 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,200 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Raghorn and similar soils

*Extent:* 80 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Fine-loamy alluvium over sandy alluvium derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 6.1 inches

### Additional Components

Bronec and similar soils: 7 percent of the unit  
 Varney and similar soils: 6 percent of the unit  
 Cozberg and similar soils: 4 percent of the unit  
 Yetull and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 72F—Zbart-Rock outcrop association, 25 to 70 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys, foothills  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 17 inches  
*Frost-free period:* 80 to 115 days

### Component Description

#### Zbart and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, interfluves, ridges

*Slope:* 25 to 70 percent

*Surface layer texture:* Very channery loam

*Depth to restrictive feature:* 5 to 10 inches to bedrock (lithic)

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly residuum derived from claystone

Gravelly residuum derived from hard, fractured shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 0.8 inch

### Rock outcrop

*Extent:* 30 percent of the map unit

*Definition:* This component consists mainly of areas of exposed hard, fractured shale bedrock.

Flagstones litter the areas and accumulate at the base of hills and escarpments.

### Additional Components

Bondoe and similar soils: 4 percent of the unit  
 Brocko and similar soils: 4 percent of the unit  
 Benz and similar soils: 3 percent of the unit  
 Crago and similar soils: 3 percent of the unit  
 Whitlash and similar soils: 3 percent of the unit  
 Windham and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 73C—Martinsdale loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Martinsdale and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 2 to 8 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, fine-loamy alluvium derived from granite

Calcareous, fine-loamy slope alluvium derived

from fine grained sandstone, siltstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.2 inches

### Additional Components

Farnuf and similar soils: 4 percent

Martinsdale, stony, and similar soils: 3 percent

Work and similar soils: 3 percent

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 74D—Shawmut gravelly loam, 4 to 15 percent slopes, bouldery

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Shawmut and similar soils

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides

*Slope:* 4 to 15 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.4 inches

### Additional Components

Martinsdale and similar soils: 6 percent of the unit

Wickes and similar soils: 5 percent of the unit

Wimper and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 75C—Sixbeacon loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Sixbeacon and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, terraces, valley floors

*Slope:* 2 to 8 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, gravelly alluvium over sandy and gravelly Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.3 inches

### Additional Components

Anamac and similar soils: 3 percent of the unit

Sixbeacon soils that have slopes of more than 8 percent: 3 percent of the unit

Bronec and similar soils: 2 percent of the unit

Sieben and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 76A—Absay silty clay loam, 0 to 4 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands, river valleys

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Absay and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, stream terraces

*Slope:* 0 to 4 percent

*Surface layer texture:* Silty clay loam

*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Saline, sodic, clayey alluvium derived from shale-siltstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Salinity:* Saline within a depth of 30 inches  
*Sodicity:* Sodic within a depth of 30 inches  
*Available water capacity:* Mainly 5.8 inches

### Additional Components

Ethridge and similar soils: 4 percent of the unit  
 Trudau and similar soils: 2 percent of the unit  
 Varney and similar soils: 2 percent of the unit  
 Zatony and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 77F—Rock outcrop-Pensore, stony-Crago, stony, association, 25 to 60 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Rock outcrop

*Extent:* 40 percent of the map unit  
*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

#### Pensore and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, knolls, ridges, strath terraces  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from limestone  
*Native plant cover type:* Rangeland

*Flooding:* None  
*Available water capacity:* Mainly 1.4 inches

### Crago and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, gravelly alluvium derived from limestone  
     Calcareous, gravelly colluvium derived from limestone  
     Calcareous, gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.2 inches

### Additional Components

Roto and similar soils: 4 percent of the unit  
 Amesha and similar soils: 2 percent of the unit  
 Crago soils that have slopes of less than 25 percent: 2 percent of the unit  
 Kalsted and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 79A—Chinook sandy loam, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Chinook and similar soils

*Extent:* 95 percent of the map unit  
*Geomorphic position:* Alluvial fans, hills, terraces  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained

*Parent material:*

Coarse-loamy alluvium

Coarse-loamy eolian deposits

*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 6.3 inches**Additional Components**

Amesha and similar soils: 2 percent of the unit

Cozberg and similar soils: 2 percent of the unit

Kalsted and similar soils: 1 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**79C—Chinook sandy loam, 2 to 8 percent slopes****Map Unit Setting***Landscape:* Valleys, uplands*Elevation:* 3,800 to 5,000 feet*Mean annual precipitation:* 10 to 14 inches*Frost-free period:* 90 to 115 days**Component Description****Chinook and similar soils***Extent:* 95 percent of the map unit*Geomorphic position:* Alluvial fans, hills, terraces*Slope:* 2 to 8 percent*Surface layer texture:* Sandy loam*Restrictive feature:* None noted*Drainage class:* Well drained*Parent material:*

Coarse-loamy alluvium

Coarse-loamy eolian deposits

*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 6.3 inches**Additional Components**

Cozberg and similar soils: 2 percent of the unit

Raghorn and similar soils: 2 percent of the unit

Amesha and similar soils: 1 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**79D—Chinook sandy loam, 8 to 15 percent slopes****Map Unit Setting***Landscape:* Valleys, uplands*Elevation:* 3,800 to 5,000 feet*Mean annual precipitation:* 10 to 14 inches*Frost-free period:* 90 to 115 days**Component Description****Chinook and similar soils***Extent:* 90 percent of the map unit*Geomorphic position:* Alluvial fans, hills, terraces*Slope:* 8 to 15 percent*Surface layer texture:* Sandy loam*Restrictive feature:* None noted*Drainage class:* Well drained*Parent material:*

Coarse-loamy alluvium

Coarse-loamy eolian deposits

*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 6.3 inches**Additional Components**

Kalsted and similar soils: 4 percent of the unit

Amesha and similar soils: 2 percent of the unit

Cozberg and similar soils: 2 percent of the unit

Raghorn and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**79E—Chinook sandy loam, 15 to 25 percent slopes****Map Unit Setting***Landscape:* Valleys, uplands*Elevation:* 3,800 to 5,500 feet*Mean annual precipitation:* 10 to 14 inches*Frost-free period:* 90 to 115 days**Component Description****Chinook and similar soils***Extent:* 85 percent of the map unit*Geomorphic position:* Alluvial fans, hills, terraces*Slope:* 15 to 25 percent*Surface layer texture:* Sandy loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy alluvium

Coarse-loamy eolian deposits

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.3 inches

### Additional Components

Kalsted and similar soils: 5 percent of the unit  
Amesha and similar soils: 4 percent of the unit  
Bronec and similar soils: 2 percent of the unit  
Cozberg and similar soils: 2 percent of the unit  
Vendome and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 80A—Floweree silt loam, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Floweree and similar soils

*Extent:* 95 percent of the map unit

*Geomorphic position:* Alluvial fans, knolls, terraces

*Slope:* 0 to 2 percent

*Surface layer texture:* Silt loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-silty alluvium derived from semiconsolidated shale-siltstone

Fine-silty, calcareous loess

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 10.1 inches

### Additional Components

Brocko and similar soils: 3 percent of the unit  
Amesha and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 80C—Floweree silt loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Floweree and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, knolls, terraces

*Slope:* 2 to 8 percent

*Surface layer texture:* Silt loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-silty alluvium derived from semiconsolidated shale-siltstone

Fine-silty, calcareous loess

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 10.1 inches

### Additional Components

Floweree soils that have slopes of more than 8 percent: 6 percent of the unit  
Amesha and similar soils: 2 percent of the unit  
Brocko and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 81A—Ethridge clay loam, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Ethridge and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, terraces

*Slope:* 0 to 2 percent

*Surface layer texture:* Clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Clayey alluvium derived from semiconsolidated, clayey shale

Clayey slope alluvium derived from semiconsolidated, clayey shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 9.6 inches

### Additional Components

Kobarter and similar soils: 3 percent of the unit

Varney and similar soils: 3 percent of the unit

Shoddy and similar soils: 2 percent of the unit

Udecide and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 81C—Ethrige clay loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Ethrige and similar soils

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, terraces

*Slope:* 2 to 8 percent

*Surface layer texture:* Clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Clayey alluvium derived from semiconsolidated, clayey shale

Clayey slope alluvium derived from semiconsolidated, clayey shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 9.6 inches

### Additional Components

Kobarter and similar soils: 5 percent of the unit

Varney and similar soils: 4 percent of the unit

Cabbart and similar soils: 2 percent of the unit

Shoddy and similar soils: 2 percent of the unit

Udecide and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 82C—Rothiemay very gravelly loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Rothiemay and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, knolls, terraces

*Slope:* 2 to 8 percent

*Surface layer texture:* Very gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, fine-loamy Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.9 inches

### Additional Components

Bronc and similar soils: 5 percent of the unit

Amesha and similar soils: 3 percent of the unit

Sappington and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 83C—Shoddy silty clay loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Shoddy and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Hills, knolls, ridges

*Slope:* 2 to 8 percent  
*Surface layer texture:* Silty clay loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (paralithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, clayey residuum derived from semiconsolidated shale-siltstone  
     Calcareous, clayey slope alluvium over residuum derived from semiconsolidated shale-siltstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.7 inches

### Additional Components

Cabbart and similar soils: 4 percent of the unit  
 Amesha and similar soils: 3 percent of the unit  
 Brocko and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 83D—Shoddy silty clay loam, 8 to 15 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Shoddy and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Hills, knolls, ridges  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Silty clay loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (paralithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, clayey residuum derived from semiconsolidated shale-siltstone  
     Calcareous, clayey slope alluvium over residuum derived from semiconsolidated shale-siltstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.7 inches

### Additional Components

Kobarter and similar soils: 4 percent of the unit

Amesha and similar soils: 2 percent of the unit  
 Brocko and similar soils: 2 percent of the unit  
 Crago and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 84A—Clunton-Faith-Dougcliff complex, 1 to 4 percent slopes

### Map Unit Setting

*Landscape:* River valleys, valleys, uplands, foothills, mountains  
*Elevation:* 3,940 to 6,500 feet  
*Mean annual precipitation:* 12 to 19 inches  
*Frost-free period:* 80 to 105 days

### Component Description

#### Clunton and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Flood plains, flood-plain steps  
*Slope:* 1 to 4 percent  
*Surface layer texture:* Silt loam  
*Restrictive feature:* None noted  
*Drainage class:* Very poorly drained  
*Parent material:* Fine-loamy alluvium over sandy and gravelly alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 9.7 inches

#### Faith and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, drainageways, flood-plain steps, terraces  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Moderately well drained  
*Parent material:* Fine-loamy alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 10.1 inches

#### Dougcliff and similar soils

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps, swales on terraces  
*Slope:* 0 to 1 percent

*Surface layer texture:* Mucky peat  
*Restrictive feature:* None noted  
*Drainage class:* Very poorly drained  
*Parent material:* Organic, herbaceous material over fine-silty alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Water table:* Within a depth of 60 inches  
*Ponding duration:* Brief  
*Available water capacity:* Mainly 20.7 inches

#### **Additional Components**

Meadowcreek and similar soils: 4 percent of the unit  
 Cometcrik and similar soils: 3 percent of the unit  
 Eagleton and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **85D—Walbert coarse sandy loam, 4 to 15 percent slopes**

#### **Map Unit Setting**

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

#### **Component Description**

##### **Walbert and similar soils**

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Hillsides, interfluves, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (paralithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:* Sandy residuum derived from semiconsolidated, coarse-grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.0 inch

#### **Additional Components**

Udecide and similar soils: 4 percent  
 Varney and similar soils: 4 percent  
 Shoddy and similar soils: 3 percent  
 Amesha and similar soils: 2 percent  
 Brocko and similar soils: 2 percent

#### **Management**

- For information about managing this map unit,

see the appropriate sections in Part II of this publication.

### **87C—Kobarter clay loam, 2 to 8 percent slopes**

#### **Map Unit Setting**

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,200 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

#### **Component Description**

##### **Kobarter and similar soils**

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Clayey slope alluvium derived from semiconsolidated shale-siltstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.2 inches

#### **Additional Components**

Kobarter, cobbly, and similar soils: 5 percent of the unit  
 Ethridge and similar soils: 4 percent of the unit  
 Abor and similar soils: 2 percent of the unit  
 Shoddy and similar soils: 2 percent of the unit  
 Varney and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **87D—Kobarter clay loam, 8 to 15 percent slopes**

#### **Map Unit Setting**

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,200 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

#### **Component Description**

##### **Kobarter and similar soils**

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls  
*Slope:* 8 to 15 percent

*Surface layer texture:* Clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Clayey slope alluvium derived from semiconsolidated shale-siltstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.2 inches

#### **Additional Components**

Ethridge and similar soils: 5 percent of the unit  
 Abor and similar soils: 4 percent of the unit  
 Shoddy and similar soils: 3 percent of the unit  
 Varney and similar soils: 2 percent of the unit  
 Brocko and similar soils: 1 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **88C—Lahood loam, 2 to 8 percent slopes**

#### **Map Unit Setting**

*Landscape:* Uplands, foothills, valleys  
*Elevation:* 3,800 to 5,250 feet  
*Mean annual precipitation:* 10 to 17 inches  
*Frost-free period:* 80 to 115 days

#### **Component Description**

##### **Lahood and similar soils**

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, strath terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium over residuum derived from basalt  
 Gravelly colluvium over residuum derived from fine grained sandstone  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone  
 Gravelly slope alluvium over residuum derived from basalt  
 Gravelly slope alluvium over residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland

*Flooding:* None  
*Available water capacity:* Mainly 4.6 inches

#### **Additional Components**

Whitlash and similar soils: 4 percent of the unit  
 Brickner and similar soils: 2 percent of the unit  
 Floweree and similar soils: 2 percent of the unit  
 Varney and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **88D—Lahood loam, 8 to 15 percent slopes**

#### **Map Unit Setting**

*Landscape:* Uplands, foothills, valleys  
*Elevation:* 3,800 to 5,250 feet  
*Mean annual precipitation:* 10 to 17 inches  
*Frost-free period:* 80 to 115 days

#### **Component Description**

##### **Lahood and similar soils**

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, strath terraces  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium over residuum derived from basalt  
 Gravelly colluvium over residuum derived from fine grained sandstone  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone  
 Gravelly slope alluvium over residuum derived from basalt  
 Gravelly slope alluvium over residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.6 inches

#### **Additional Components**

Whitlash and similar soils: 5 percent of the unit  
 Rock outcrop: 4 percent of the unit

Brickner and similar soils: 2 percent of the unit  
 Brocko and similar soils: 2 percent of the unit  
 Bronec and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 92D—Clunton, Cometcrik, and Perma, stony, soils, 0 to 15 percent slopes

### Map Unit Setting

*Landscape:* River valleys, foothills, mountains, uplands, valleys  
*Elevation:* 3,940 to 6,500 feet  
*Mean annual precipitation:* 12 to 19 inches  
*Frost-free period:* 80 to 105 days

### Component Description

#### Clunton and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Flood plains, flood-plain steps  
*Slope:* 0 to 4 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Very poorly drained  
*Parent material:* Fine-loamy alluvium over sandy and gravelly alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Frequent  
*Water table:* Within a depth of 60 inches  
*Ponding duration:* Brief  
*Available water capacity:* Mainly 9.7 inches

#### Cometcrik and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Poorly drained  
*Parent material:* Fine-loamy alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Frequent  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 9.4 inches

#### Perma and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges

*Slope:* 4 to 15 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 4.4 inches

### Additional Components

Clunton, cool, and similar soils: 5 percent of the unit  
 Meadowcreek and similar soils: 4 percent of the unit  
 Dougcliff and similar soils: 2 percent of the unit  
 Eagleton and similar soils: 2 percent of the unit  
 Faith and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 99D—Libeg gravelly loam, 4 to 15 percent slopes, bouldery

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Libeg and similar soils

*Extent:* 80 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly alluvium  
 Gravelly colluvium  
 Gravelly slope alluvium  
 Gravelly till

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.7 inches

### **Additional Components**

Libeg silty clay loam and similar soils: 6 percent of the unit

Nieman and similar soils: 4 percent of the unit

Rock outcrop: 4 percent of the unit

Surdal and similar soils: 3 percent of the unit

Tibkey and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **99E—Libeg very gravelly loam, 15 to 35 percent slopes, bouldery**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Libeg and similar soils**

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces

*Slope:* 15 to 35 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly alluvium

Gravelly colluvium

Gravelly slope alluvium

Gravelly till

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.3 inches

### **Additional Components**

Libeg, very bouldery, and similar soils: 5 percent of the unit

Monaberg and similar soils: 5 percent of the unit

Nieman and similar soils: 5 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **113C—Amesha-Amesha, stony, complex, 2 to 8 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Amesha and similar soils**

*Extent:* 60 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 2 to 8 percent

*Surface layer texture:* Cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.3 inches

#### **Amesha, stony, and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 2 to 8 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.3 inches

### **Additional Components**

Bronec and similar soils: 6 percent of the unit

Amesha soils that have slopes of more than 8 percent:  
5 percent of the unit  
Sappington and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 113D—Amesha-Amesha, stony, complex, 8 to 15 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Amesha and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Cobbly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
    Calcareous, coarse-loamy Tertiary valley fill alluvium  
    Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.3 inches

#### Amesha, stony, and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
    Calcareous, coarse-loamy Tertiary valley fill alluvium  
    Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.3 inches

### Additional Components

Crago and similar soils: 8 percent of the unit  
Amesha soils that have slopes of more than 15 percent: 7 percent of the unit  
Sappington and similar soils: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 114D—Amesha-Crago-Shoddy complex, 4 to 15 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Amesha and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
    Calcareous, coarse-loamy Tertiary valley fill alluvium  
    Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.0 inches

#### Crago and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
    Calcareous, gravelly alluvium derived from limestone  
    Calcareous, gravelly colluvium derived from limestone  
    Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.3 inches

### **Shoddy and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Hills, knolls, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Silty clay loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (paralithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, clayey residuum derived from semiconsolidated shale-siltstone  
     Calcareous, clayey slope alluvium over residuum derived from semiconsolidated shale-siltstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.7 inches

### **Additional Components**

Anamac and similar soils: 4 percent of the unit  
 Cabbart and similar soils: 4 percent of the unit  
 Walbert and similar soils: 3 percent of the unit  
 Brocko and similar soils: 2 percent of the unit  
 Sappington and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **114E—Amesha-Crago-Shoddy complex, 15 to 45 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Amesha and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained

*Parent material:*  
     Calcareous, coarse-loamy Tertiary valley fill alluvium  
     Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.0 inches

#### **Crago and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

    Calcareous, gravelly alluvium derived from limestone  
     Calcareous, gravelly colluvium derived from limestone  
     Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.3 inches

#### **Shoddy and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Hills, knolls, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Silty clay loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (paralithic)  
*Drainage class:* Well drained  
*Parent material:*

    Calcareous, clayey residuum derived from semiconsolidated shale-siltstone  
     Calcareous, clayey slope alluvium over residuum derived from semiconsolidated shale-siltstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.7 inches

### **Additional Components**

Bronc and similar soils: 3 percent of the unit  
 Cabbart and similar soils: 3 percent of the unit  
 Walbert and similar soils: 3 percent of the unit  
 Anamac and similar soils: 2 percent of the unit  
 Brocko and similar soils: 2 percent of the unit  
 Sappington and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 115A—Amesha gravelly loam, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Amesha and similar soils

*Extent:* 95 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, coarse-loamy Tertiary valley fill alluvium  
     Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.3 inches

### Additional Components

Bronec and similar soils: 2 percent of the unit  
 Sappington and similar soils: 2 percent of the unit  
 Geohrock and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 115C—Amesha gravelly loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Amesha and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 2 to 8 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

    Calcareous, coarse-loamy Tertiary valley fill alluvium

    Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.3 inches

### Additional Components

Bronec and similar soils: 5 percent of the unit  
 Amesha soils that have slopes of more than 8 percent: 3 percent of the unit  
 Sappington and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 115D—Amesha gravelly loam, 8 to 15 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Amesha and similar soils

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, coarse-loamy Tertiary valley fill alluvium  
     Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.3 inches

### Additional Components

Bronec and similar soils: 4 percent of the unit  
 Crago and similar soils: 4 percent of the unit

Kalsted and similar soils: 3 percent of the unit  
 Geohrock and similar soils: 2 percent of the unit  
 Sappington and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 115E—Amesha gravelly loam, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Amesha and similar soils

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, coarse-loamy Tertiary valley fill alluvium  
     Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.3 inches

### Additional Components

Bronec and similar soils: 4 percent of the unit  
 Crago and similar soils: 4 percent of the unit  
 Kalsted and similar soils: 3 percent of the unit  
 Geohrock and similar soils: 2 percent of the unit  
 Sappington and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 116A—Amesha loam, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Amesha and similar soils

*Extent:* 95 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, coarse-loamy Tertiary valley fill alluvium  
     Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.0 inches

### Additional Components

Bronec and similar soils: 2 percent of the unit  
 Kalsted and similar soils: 2 percent of the unit  
 Sappington and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 116C—Amesha loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Amesha and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, coarse-loamy Tertiary valley fill alluvium  
     Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 9.0 inches

### **Additional Components**

Bronec and similar soils: 3 percent of the unit

Kalsted and similar soils: 2 percent of the unit

Sappington and similar soils: 2 percent of the unit

Amesha soils that have slopes of more than 8 percent:  
1 percent of the unit

Cabbart and similar soils: 1 percent of the unit

Delpoint and similar soils: 1 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **116D—Amesha loam, 8 to 15 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Amesha and similar soils**

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 8 to 15 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 9.0 inches

### **Additional Components**

Bronec and similar soils: 4 percent of the unit

Amesha, stony, and similar soils: 3 percent of the unit

Sappington and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **117E—Amesha-Cabbart-Bronec cobbly loams, 4 to 25 percent slopes**

### **Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Amesha and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 4 to 15 percent

*Surface layer texture:* Cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.3 inches

#### **Cabbart and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Escarpments, hills, knolls

*Slope:* 8 to 25 percent

*Surface layer texture:* Cobbly loam

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

*Drainage class:* Well drained

*Parent material:*

Loamy residuum derived from semiconsolidated siltstone

Loamy slope alluvium over residuum derived from calcareous siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.4 inches

#### **Bronec and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 4 to 15 percent

*Surface layer texture:* Cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.0 inches

### Additional Components

Anamac and similar soils: 4 percent of the unit

Bronec, very gravelly, and similar soils: 4 percent of the unit

Sappington and similar soils: 3 percent of the unit

Brocko and similar soils: 2 percent of the unit

Shoddy and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 118C—Amesha cobbly loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Amesha and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 2 to 8 percent

*Surface layer texture:* Cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.3 inches

### Additional Components

Bronec and similar soils: 5 percent of the unit

Sappington and similar soils: 3 percent of the unit

Amesha soils that have slopes of more than 8 percent: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 121E—Maiden-Lap-Rock outcrop complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Maiden and similar soils

*Extent:* 45 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Gravelly loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from limestone

Gravelly residuum derived from limestone

Gravelly slope alluvium over residuum derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.3 inches

#### Lap and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Very gravelly loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from limestone

Gravelly residuum derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

**Rock outcrop**

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

**Additional Components**

Judell and similar soils: 2 percent of the unit

Windham and similar soils: 2 percent of the unit

Windham, very cobbly, and similar soils: 1 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**121F—Maiden-Lap-Rock outcrop complex, 35 to 60 percent slopes****Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

**Component Description****Maiden and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Gravelly loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from limestone

Gravelly residuum derived from limestone

Gravelly slope alluvium over residuum derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.3 inches

**Lap and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Very gravelly loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from limestone

Gravelly residuum derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

**Rock outcrop**

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

**Additional Components**

Judell and similar soils: 2 percent of the unit

Windham and similar soils: 2 percent of the unit

Windham soils that have slopes of less than 35 percent: 1 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**122D—Maiden-Lap-Windham complex, 4 to 15 percent slopes****Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

**Component Description****Maiden and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Very gravelly loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from limestone

Gravelly residuum derived from limestone

Gravelly slope alluvium over residuum derived from limestone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.9 inches

#### **Lap and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Very gravelly loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium over residuum derived from limestone  
 Gravelly residuum derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

#### **Windham and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from limestone  
 Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.1 inches

#### **Additional Components**

Judell and similar soils: 3 percent of the unit  
 Rock outcrop: 3 percent of the unit  
 Wimper and similar soils: 2 percent of the unit  
 Windham, very stony, and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **122E—Maiden-Lap-Windham complex, 15 to 35 percent slopes**

#### **Map Unit Setting**

*Landscape:* Uplands, foothills  
*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Maiden and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very gravelly loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium over residuum derived from limestone  
 Gravelly residuum derived from limestone  
 Gravelly slope alluvium over residuum derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.9 inches

##### **Lap and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very gravelly loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium over residuum derived from limestone  
 Gravelly residuum derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

##### **Windham and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from limestone  
 Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.1 inches

### Additional Components

Judell and similar soils: 5 percent of the unit  
 Rock outcrop: 4 percent of the unit  
 Wimper and similar soils: 4 percent of the unit  
 Windham, very stony, and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 122F—Maiden-Lap-Windham complex, 35 to 60 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,000 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Maiden and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very gravelly loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

- Gravelly colluvium over residuum derived from limestone
- Gravelly residuum derived from limestone
- Gravelly slope alluvium over residuum derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

#### Lap and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very gravelly loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

- Gravelly colluvium over residuum derived from limestone
- Gravelly residuum derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

#### Windham and similar soils

*Extent:* 15 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from limestone

Gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.1 inches

### Additional Components

Rock outcrop: 6 percent of the unit

Windham, very stony, and similar soils: 5 percent of the unit

Maiden, very stony, and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 123E—Maiden, very stony-Rock outcrop-Lap, very stony, complex, 8 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,000 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Maiden and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 8 to 15 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from limestone

Gravelly residuum derived from limestone

Gravelly slope alluvium over residuum derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.7 inches

**Rock outcrop**

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

**Lap and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from limestone

Gravelly residuum derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

**Additional Components**

Windham and similar soils: 4 percent of the unit

Lap, moist, and similar soils: 3 percent of the unit

Windham, stony, and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **123F—Maiden, very stony-Rock outcrop-Lap, very stony, complex, 35 to 60 percent slopes**

**Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

**Component Description****Maiden and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from limestone

Gravelly residuum derived from limestone

Gravelly slope alluvium over residuum derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.7 inches

**Rock outcrop**

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

**Lap, cool, and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from limestone

Gravelly residuum derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

**Additional Components**

Windham, very stony, and similar soils: 4 percent of the unit

Lap and similar soils: 3 percent of the unit  
 Windham and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 125D—Maiden-Lap-Windham complex, 4 to 15 percent slopes, warm

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,000 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

### Component Description

#### Maiden and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Very gravelly loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium over residuum derived from limestone  
     Gravelly residuum derived from limestone  
     Gravelly slope alluvium over residuum derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.9 inches

#### Lap and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Very gravelly loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium over residuum derived from limestone  
     Gravelly residuum derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

#### Windham and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from limestone  
     Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.1 inches

### Additional Components

Maiden soils that have slopes of more than 15 percent: 6 percent of the unit  
 Windham soils that have slopes of more than 15 percent: 4 percent of the unit  
 Wimper and similar soils: 3 percent of the unit  
 Rock outcrop: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 125E—Maiden-Lap-Windham complex, 15 to 35 percent slopes, warm

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,000 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

### Component Description

#### Maiden and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very gravelly loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium over residuum derived from limestone  
     Gravelly residuum derived from limestone  
     Gravelly slope alluvium over residuum derived from limestone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.9 inches

#### **Lap and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very gravelly loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium over residuum derived from limestone  
     Gravelly residuum derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

#### **Windham and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from limestone  
     Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.1 inches

#### **Additional Components**

Maiden soils that have slopes of more than 35 percent: 7 percent of the unit  
 Wimper and similar soils: 5 percent of the unit  
 Windham soils that have slopes of more than 35 percent: 5 percent of the unit  
 Rock outcrop: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **126F—Maiden, very stony-Rock outcrop-Lap, very stony, complex, 35 to 60 percent slopes, warm**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,000 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

#### **Component Description**

##### **Maiden and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium over residuum derived from limestone  
     Gravelly residuum derived from limestone  
     Gravelly slope alluvium over residuum derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.7 inches

##### **Rock outcrop**

*Extent:* 25 percent of the map unit  
*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

##### **Lap and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from limestone

Gravelly residuum derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

### Additional Components

Maiden soils that have slopes of less than 35 percent:  
6 percent of the unit

Windham and similar soils: 5 percent of the unit

Wimper and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 132A—Anamac silt loam, 0 to 2 percent slopes, saline

### Map Unit Setting

*Landscape:* Valleys, river valleys, uplands

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Anamac and similar soils

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 0 to 2 percent

*Surface layer texture:* Silt loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, fine-loamy alluvium or Tertiary valley fill

*Native plant cover type:* Rangeland

*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches

*Salinity:* Saline within a depth of 30 inches

*Sodicity:* Sodic within a depth of 30 inches

*Available water capacity:* Mainly 9.1 inches

### Additional Components

Trudau and similar soils: 5 percent of the unit

Ethridge and similar soils: 4 percent of the unit

Bronec and similar soils: 3 percent of the unit

Varney and similar soils: 2 percent of the unit

Brocko and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 151D—Delpoint-Abor complex, 4 to 15 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Delpoint and similar soils

*Extent:* 45 percent of the map unit

*Geomorphic position:* Escarpments, hills, knolls

*Slope:* 4 to 15 percent

*Surface layer texture:* Loam

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy alluvium over loamy residuum derived from semiconsolidated sandstone-siltstone

Fine-loamy residuum derived from semiconsolidated sandstone-siltstone

Fine-loamy slope alluvium over loamy residuum derived from semiconsolidated sandstone-siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.0 inches

#### Abor and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Hills, knolls, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Clay

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

*Drainage class:* Well drained

*Parent material:*

Calcareous, clayey slope alluvium over residuum derived from semiconsolidated shale-siltstone

Calcareous, clayey residuum derived from semiconsolidated shale-siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.8 inches

### Additional Components

Shoddy and similar soils: 6 percent of the unit  
 Brocko and similar soils: 5 percent of the unit  
 Cabbart and similar soils: 4 percent of the unit  
 Kobarter and similar soils: 4 percent of the unit  
 Amesha and similar soils: 3 percent of the unit  
 Ethridge and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 171D—Branham-Opitz-Tuggle complex, 2 to 15 percent slopes

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Branham, warm, and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Sandy loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*

Sandy and gravelly residuum derived from granite  
 Sandy and gravelly colluvium over residuum derived from granite  
 Coarse-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.9 inches

#### Opitz and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Mountain slopes, plateaus, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Sandy loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Coarse-loamy colluvium over residuum derived from granite

Coarse-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

### Tuggle and similar soils

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Escarpments, mountain slopes, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Loamy residuum derived from granite  
 Loamy slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.7 inches

### Additional Components

Branham, moist, and similar soils: 6 percent of the unit  
 Caseypeak and similar soils: 5 percent of the unit  
 Branham loam and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 171E—Branham-Opitz-Tuggle complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Branham, warm, and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Sandy loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Sandy and gravelly residuum derived from granite

Sandy and gravelly colluvium over residuum  
derived from granite

Coarse-loamy slope alluvium over residuum  
derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

#### **Opitz and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Mountain slopes, plateaus,  
ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Sandy loam

*Depth to restrictive feature:* 20 to 40 inches to bedrock  
(paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy colluvium over residuum derived  
from granite

Coarse-loamy slope alluvium over residuum  
derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

#### **Tuggle and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Escarpments, mountain slopes,  
ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Coarse sandy loam

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

*Drainage class:* Well drained

*Parent material:*

Loamy residuum derived from granite

Loamy slope alluvium derived from granite over  
residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.7 inches

#### **Additional Components**

Branham, moist, and similar soils: 6 percent of the unit

Caseypeak and similar soils: 5 percent of the unit

Branham loam and similar soils: 4 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **172D—Branham-Clugulch-Rock outcrop complex, 2 to 15 percent slopes**

#### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

#### **Component Description**

##### **Branham and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Mountain slopes, ridges

*Slope:* 2 to 15 percent

*Surface layer texture:* Sandy loam

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

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly residuum derived from granite

Sandy and gravelly colluvium over residuum  
derived from granite

Coarse-loamy slope alluvium over residuum  
derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

##### **Clugulch and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Mountainsides, ridges

*Slope:* 2 to 15 percent

*Surface layer texture:* Sandy loam

*Depth to restrictive feature:* 4 to 10 inches to bedrock  
(lithic)

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 0.7 inch

##### **Rock outcrop**

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

#### **Additional Components**

Caseypeak and similar soils: 5 percent of the unit

Tuggle and similar soils: 4 percent of the unit  
 Branham, moist, and similar soils: 3 percent of the unit  
 Opitz and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 172E—Branham-Clugulch-Rock outcrop complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Branham and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Sandy loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Sandy and gravelly residuum derived from granite  
     Sandy and gravelly colluvium over residuum derived from granite  
     Coarse-loamy slope alluvium over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.9 inches

#### Clugulch and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Mountainsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Sandy loam  
*Depth to restrictive feature:* 4 to 10 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 0.7 inch

#### Rock outcrop

*Extent:* 20 percent of the map unit  
*Definition:* This component consists mainly of exposed

areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Tuggle and similar soils: 5 percent of the unit  
 Opitz and similar soils: 4 percent of the unit  
 Branham, moist, and similar soils: 3 percent of the unit  
 Caseypeak and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 173F—Branham, stony-Tuggle, very stony-Rock outcrop complex, 35 to 60 percent slopes

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 8,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 40 to 70 days

### Component Description

#### Branham and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Sandy and gravelly residuum derived from granite  
     Sandy and gravelly colluvium over residuum derived from granite  
     Coarse-loamy slope alluvium over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.4 inches

#### Tuggle and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, mountain slopes, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Loamy residuum derived from granite

Loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.7 inches

### **Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### **Additional Components**

Clugulch and similar soils: 6 percent of the unit

Hiore and similar soils: 5 percent of the unit

Bobowic and similar soils: 2 percent of the unit

Opitz and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **182D—Brocko-Amesha complex, 4 to 15 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Brocko and similar soils**

*Extent:* 55 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Silt loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Coarse-silty, calcareous alluvium

Coarse-silty, calcareous loess

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 11.8 inches

### **Amesha and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 4 to 15 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.3 inches

### **Additional Components**

Bronec and similar soils: 5 percent of the unit

Brocko soils that have slopes of more than 15 percent: 4 percent of the unit

Amesha soils that have slopes of more than 15 percent: 3 percent of the unit

Kalsted and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **183E—Brocko-Rock outcrop-Rencot complex, 8 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Brocko and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Silt loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Coarse-silty, calcareous alluvium

Coarse-silty, calcareous loess

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 11.8 inches

### Rock outcrop

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard sedimentary, metamorphic, and fine grained volcanic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

### Rencot and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, strath terraces

*Slope:* 8 to 35 percent

*Surface layer texture:* Very gravelly loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.4 inches

### Additional Components

Bronec and similar soils: 4 percent of the unit

Haxby and similar soils: 3 percent of the unit

Sixbeacon and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 184E—Brocko-Rock outcrop-Bronec, very stony, complex, 15 to 45 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Brocko and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Silt loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Coarse-silty, calcareous alluvium

Coarse-silty, calcareous loess

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 11.8 inches

### Rock outcrop

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of areas of exposed hard, fractured shale bedrock.

Flagstones litter the areas and accumulate at the base of hills and escarpments.

### Bronec and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 15 to 45 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.7 inches

### Additional Components

Cabbart and similar soils: 4 percent of the unit

Shoddy and similar soils: 3 percent of the unit

Haxby and similar soils: 2 percent of the unit

Rencot and similar soils: 2 percent of the unit

Sappington and similar soils: 2 percent of the unit

Sixbeacon and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 191C—Cabbart-Shoddy-Amesha complex, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Cabbart and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hills, knolls  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (paralithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Loamy residuum derived from semiconsolidated siltstone  
 Loamy slope alluvium over residuum derived from calcareous siltstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.7 inches

#### Shoddy and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Hills, knolls, ridges  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Silty clay loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (paralithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Calcareous, clayey residuum derived from semiconsolidated shale-siltstone  
 Calcareous, clayey slope alluvium over residuum derived from semiconsolidated shale-siltstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.7 inches

#### Amesha and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Calcareous, coarse-loamy Tertiary valley fill alluvium  
 Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.3 inches

### Additional Components

Brocko and similar soils: 5 percent of the unit  
 Bronec and similar soils: 4 percent of the unit  
 Kobarter and similar soils: 3 percent of the unit  
 Walbert and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 191D—Cabbart-Shoddy-Amesha complex, 8 to 15 percent slopes

#### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Cabbart and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Escarpments, hills, knolls  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (paralithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Loamy residuum derived from semiconsolidated siltstone  
 Loamy slope alluvium over residuum derived from calcareous siltstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.7 inches

#### Shoddy and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Hills, knolls, ridges  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Silty clay loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (paralithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Calcareous, clayey residuum derived from semiconsolidated shale-siltstone  
 Calcareous, clayey slope alluvium over residuum derived from semiconsolidated shale-siltstone  
*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.7 inches

### **Amesha and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 8 to 15 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.3 inches

### **Additional Components**

Brocko and similar soils: 4 percent of the unit

Bronec and similar soils: 4 percent of the unit

Walbert and similar soils: 3 percent of the unit

Kobarter and similar soils: 2 percent of the unit

Udecide and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **191E—Cabbart-Shoddy-Amesha complex, 15 to 45 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Cabbart and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Escarpments, hills, knolls

*Slope:* 15 to 45 percent

*Surface layer texture:* Gravelly loam

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

*Drainage class:* Well drained

*Parent material:*

Loamy residuum derived from semiconsolidated siltstone

Loamy slope alluvium over residuum derived from calcareous siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.4 inches

### **Shoddy and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Hills, knolls, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Silty clay loam

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

*Drainage class:* Well drained

*Parent material:*

Calcareous, clayey residuum derived from semiconsolidated shale-siltstone

Calcareous, clayey slope alluvium over residuum derived from semiconsolidated shale-siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.7 inches

### **Amesha and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 15 to 45 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.3 inches

### **Additional Components**

Cabbart, very stony, and similar soils: 6 percent of the unit

Abor and similar soils: 5 percent of the unit

Sappington and similar soils: 4 percent of the unit

Delpoint and similar soils: 3 percent of the unit

Rock outcrop: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **192C—Cabbart clay loam, 2 to 8 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Cabbart and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Escarpments, hills, knolls

*Slope:* 2 to 8 percent

*Surface layer texture:* Clay loam

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

*Drainage class:* Well drained

*Parent material:*

Loamy residuum derived from semiconsolidated siltstone

Loamy slope alluvium over residuum derived from calcareous siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.5 inches

### Additional Components

Abor and similar soils: 2 percent of the unit

Brocko and similar soils: 2 percent of the unit

Bronec and similar soils: 2 percent of the unit

Delpoint and similar soils: 2 percent of the unit

Shoddy and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 193E—Cabbart-Haxby loams, 8 to 45 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Cabbart and similar soils

*Extent:* 50 percent of the map unit

*Geomorphic position:* Escarpments, hills, knolls

*Slope:* 8 to 45 percent

*Surface layer texture:* Loam

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

*Drainage class:* Well drained

*Parent material:*

Loamy residuum derived from semiconsolidated siltstone

Loamy slope alluvium over residuum derived from calcareous siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.7 inches

#### Haxby and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Hillsides, ridges, strath terraces

*Slope:* 15 to 45 percent

*Surface layer texture:* Loam

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

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy colluvium over gravelly residuum derived from basalt

Coarse-loamy colluvium over gravelly residuum derived from fine grained sandstone

Coarse-loamy slope alluvium over gravelly residuum derived from basalt

Coarse-loamy slope alluvium over gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.4 inches

### Additional Components

Bronec and similar soils: 5 percent of the unit

Amesha and similar soils: 4 percent of the unit

Chinook and similar soils: 3 percent of the unit

Kalsted and similar soils: 3 percent of the unit

Rencot and similar soils: 3 percent of the unit

Sappington and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 194E—Cabbart-Bronec, stony-Rencot, very stony, complex, 8 to 25 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

## Component Description

### Cabbart and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Escarpments, hills, knolls  
*Slope:* 8 to 25 percent  
*Surface layer texture:* Cobbly loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (paralithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Loamy residuum derived from semiconsolidated siltstone  
 Loamy slope alluvium over residuum derived from calcareous siltstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.4 inches

### Bronec and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors  
*Slope:* 8 to 25 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Sandy and gravelly, calcareous alluvium  
 Sandy and gravelly, calcareous slope alluvium  
 Sandy and gravelly, calcareous Tertiary valley fill alluvium  
 Sandy and gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.8 inches

### Rencot and similar soils

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, strath terraces  
*Slope:* 15 to 25 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.4 inches

## Additional Components

Geohrock and similar soils: 6 percent of the unit  
 Sappington and similar soils: 5 percent of the unit  
 Amesha and similar soils: 4 percent of the unit  
 Sixbeacon and similar soils: 3 percent of the unit  
 Cabbart, very stony, and similar soils: 2 percent of the unit

## Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 195E—Cabbart, very stony-Bronec, stony-Rock outcrop complex, 8 to 35 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

## Component Description

### Cabbart and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hills, knolls  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (paralithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Loamy residuum derived from semiconsolidated siltstone  
 Loamy slope alluvium over residuum derived from calcareous siltstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.9 inches

### Bronec and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors  
*Slope:* 8 to 25 percent

*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Sandy and gravelly, calcareous alluvium  
 Sandy and gravelly, calcareous slope alluvium  
 Sandy and gravelly, calcareous Tertiary valley fill alluvium  
 Sandy and gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.8 inches

### Rock outcrop

*Extent:* 20 percent of the map unit  
*Definition:* This component consists of exposures of weakly consolidated sedimentary beds. These beds are primarily soft siltstone and sandstone. In places, harder layers of coarse grained sandstone cap the softer beds and form ledges. Cobble- and stone-sized fragments of sandstone accumulate at the base of escarpments and on fans at the base of hills.

### Additional Components

Sappington and similar soils: 5 percent of the unit  
 Geohrock and similar soils: 4 percent of the unit  
 Amesha and similar soils: 3 percent of the unit  
 Brocko and similar soils: 3 percent of the unit  
 Haxby and similar soils: 3 percent of the unit  
 Rencot and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 195F—Cabbart, very stony-Rock outcrop-Bronec, very stony, complex, 25 to 60 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Cabbart and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hills, knolls

*Slope:* 35 to 60 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (paralithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Loamy residuum derived from semiconsolidated siltstone  
 Loamy slope alluvium over residuum derived from calcareous siltstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.9 inches

### Rock outcrop

*Extent:* 30 percent of the map unit  
*Definition:* This component consists of exposures of weakly consolidated sedimentary beds. These beds are primarily soft siltstone and sandstone. In places, harder layers of coarse grained sandstone cap the softer beds and form ledges. Cobble- and stone-sized fragments of sandstone accumulate at the base of escarpments and on fans at the base of hills.

### Bronec and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors  
*Slope:* 25 to 45 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Sandy and gravelly, calcareous alluvium  
 Sandy and gravelly, calcareous slope alluvium  
 Sandy and gravelly, calcareous Tertiary valley fill alluvium  
 Sandy and gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.8 inches

### Additional Components

Sappington and similar soils: 5 percent of the unit  
 Geohrock and similar soils: 4 percent of the unit  
 Amesha and similar soils: 3 percent of the unit  
 Brocko and similar soils: 3 percent of the unit  
 Haxby and similar soils: 3 percent of the unit  
 Rencot and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 201E—Windham-Rock outcrop-Lap, very stony, complex, 8 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

### Component Description

#### Windham and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from limestone

Gravelly slope alluvium derived from limestone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.1 inches

#### Rock outcrop

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

#### Lap and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from limestone

Gravelly residuum derived from limestone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

### Additional Components

Warneke and similar soils: 6 percent of the unit

Maiden and similar soils: 5 percent of the unit

Whitecow and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 201F—Windham, very stony-Rock outcrop-Lap, very stony, complex, 35 to 70 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Windham and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 35 to 70 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from limestone

Gravelly slope alluvium derived from limestone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.5 inches

#### Rock outcrop

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

#### Lap and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 35 to 70 percent

*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium over residuum derived from limestone  
 Gravelly residuum derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.3 inches

#### **Additional Components**

Warneke and similar soils: 6 percent of the unit  
 Maiden and similar soils: 5 percent of the unit  
 Whitecow and similar soils: 4 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **202D—Windham-Judell complex, 8 to 15 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,000 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Windham and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from limestone  
 Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.1 inches

##### **Judell and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 8 to 15 percent

*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium derived from limestone  
 Fine-loamy slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.6 inches

#### **Additional Components**

Lap and similar soils: 3 percent of the unit  
 Maiden and similar soils: 3 percent of the unit  
 Rock outcrop: 2 percent of the unit  
 Watne and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **202E—Windham-Judell complex, 15 to 35 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,000 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Windham and similar soils**

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from limestone  
 Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.9 inches

##### **Judell and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from limestone  
 Fine-loamy slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 9.6 inches

**Additional Components**

Lap and similar soils: 4 percent of the unit  
 Maiden and similar soils: 3 percent of the unit  
 Rock outcrop: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**203D—Windham gravelly loam, 4 to 15 percent slopes, stony****Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

**Component Description****Windham, stony, and similar soils**

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Gravelly colluvium derived from limestone  
 Gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.1 inches

**Additional Components**

Judell and similar soils: 4 percent of the unit  
 Maiden and similar soils: 4 percent of the unit  
 Lap and similar soils: 3 percent of the unit  
 Rock outcrop: 2 percent of the unit  
 Windham soils that are not stony: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**203E—Windham gravelly loam, 15 to 35 percent slopes, stony****Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

**Component Description****Windham, stony, and similar soils**

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from limestone  
 Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.1 inches

**Additional Components**

Judell and similar soils: 4 percent of the unit  
 Maiden and similar soils: 4 percent of the unit  
 Windham soils that are not stony: 3 percent of the unit  
 Lap and similar soils: 2 percent of the unit  
 Rock outcrop: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**204D—Windham-Maiden-Lap complex, 4 to 15 percent slopes****Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

**Component Description****Windham and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from limestone

Gravelly slope alluvium derived from limestone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.1 inches

#### **Maiden and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Very gravelly loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from limestone

Gravelly residuum derived from limestone

Gravelly slope alluvium over residuum derived from limestone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

#### **Lap and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Very gravelly loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from limestone

Gravelly residuum derived from limestone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

#### **Additional Components**

Judell and similar soils: 2 percent of the unit

Warneke and similar soils: 2 percent of the unit

Rock outcrop: 1 percent of the unit

#### **Management**

- For information about managing this map unit,

see the appropriate sections in Part II of this publication.

### **204E—Windham, stony-Maiden, very stony-Lap, very stony, complex, 15 to 35 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

#### **Component Description**

##### **Windham and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from limestone

Gravelly slope alluvium derived from limestone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.1 inches

##### **Maiden and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from limestone

Gravelly residuum derived from limestone

Gravelly slope alluvium over residuum derived from limestone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.7 inches

**Lap and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium over residuum derived from limestone  
 Gravelly residuum derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.3 inches

**Additional Components**

Rock outcrop: 6 percent of the unit  
 Judell and similar soils: 5 percent of the unit  
 Warneke and similar soils: 5 percent of the unit  
 Whitecow and similar soils: 4 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**204F—Windham, very stony-Maiden, very stony-Rock outcrop complex, 25 to 60 percent slopes****Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,000 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

**Component Description****Windham and similar soils**

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from limestone  
 Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.5 inches

**Maiden and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*

Gravelly colluvium over residuum derived from limestone  
 Gravelly residuum derived from limestone  
 Gravelly slope alluvium over residuum derived from limestone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.7 inches

**Rock outcrop**

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

**Additional Components**

Lap and similar soils: 4 percent of the unit  
 Warneke and similar soils: 3 percent of the unit  
 Whitecow and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**205E—Windham very cobbly loam, 4 to 35 percent slopes, very stony****Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,000 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Windham and similar soils

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 4 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from limestone  
 Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.5 inches

### Additional Components

Judell and similar soils: 3 percent of the unit  
 Lap and similar soils: 3 percent of the unit  
 Maiden and similar soils: 3 percent of the unit  
 Rock outcrop: 3 percent of the unit  
 Whitecow and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 205F—Windham very cobbly loam, 35 to 60 percent slopes, very stony

#### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,000 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

### Component Description

#### Windham and similar soils

*Extent:* 80 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained

#### Parent material:

Gravelly colluvium derived from limestone  
 Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.5 inches

### Additional Components

Lap and similar soils: 4 percent of the unit  
 Rock outcrop: 4 percent of the unit  
 Judell and similar soils: 3 percent of the unit  
 Maiden and similar soils: 3 percent of the unit  
 Warneke and similar soils: 3 percent of the unit  
 Whitecow and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 206F—Windham-Windham, stony, complex, 35 to 70 percent slopes

#### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Windham and similar soils

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from limestone  
 Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 4.1 inches

#### Windham, stony, and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from limestone

Gravelly slope alluvium derived from limestone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.1 inches

### **Additional Components**

Whitecow and similar soils: 6 percent of the unit

Warneke and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **207E—Windham, stony-Lap, very stony-Rock outcrop complex, 15 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

### **Component Description**

#### **Windham and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from limestone

Gravelly slope alluvium derived from limestone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.1 inches

#### **Lap and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from limestone

Gravelly residuum derived from limestone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

### **Rock outcrop**

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

### **Additional Components**

Judell and similar soils: 3 percent of the unit

Maiden and similar soils: 3 percent of the unit

Warneke and similar soils: 2 percent of the unit

Whitecow and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **207F—Windham, stony-Lap, very stony-Rock outcrop complex, 35 to 70 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Windham and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 35 to 70 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from limestone

Gravelly slope alluvium derived from limestone

*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 4.1 inches**Lap and similar soils***Extent:* 25 percent of the map unit*Geomorphic position:* Divides, escarpments, hillsides, ridges*Slope:* 35 to 70 percent*Surface layer texture:* Very gravelly loam*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)*Drainage class:* Well drained*Parent material:*

Gravelly colluvium over residuum derived from limestone

Gravelly residuum derived from limestone

*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 1.3 inches**Rock outcrop***Extent:* 25 percent of the map unit*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.**Additional Components**

Maiden and similar soils: 5 percent of the unit

Judell and similar soils: 4 percent of the unit

Warneke and similar soils: 3 percent of the unit

Whitecow and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**208D—Windham-Judell gravelly loams, 8 to 25 percent slopes, stony****Map Unit Setting***Landscape:* Foothills, uplands*Elevation:* 4,000 to 6,000 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 80 to 95 days**Component Description****Windham, stony, and similar soils***Extent:* 60 percent of the map unit*Geomorphic position:* Divides, escarpments, hillsides, ridges*Slope:* 8 to 25 percent*Surface layer texture:* Gravelly loam*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)*Restrictive feature:* None noted*Drainage class:* Well drained*Parent material:*

Gravelly colluvium derived from limestone

Gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 4.1 inches**Judell and similar soils***Extent:* 20 percent of the map unit*Geomorphic position:* Alluvial fans, hillsides, terraces*Slope:* 8 to 15 percent*Surface layer texture:* Gravelly loam*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)*Restrictive feature:* None noted*Drainage class:* Well drained*Parent material:*

Fine-loamy colluvium derived from limestone

Fine-loamy slope alluvium derived from limestone

*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 7.4 inches**Additional Components**

Maiden and similar soils: 6 percent of the unit

Lap and similar soils: 5 percent of the unit

Rock outcrop: 5 percent of the unit

Windham soils that are not stony: 4 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**211A—Clunton silty clay loam, 0 to 2 percent slopes****Map Unit Setting***Landscape:* River valleys, foothills, mountains, valleys*Elevation:* 3,800 to 6,500 feet

*Mean annual precipitation:* 12 to 19 inches

*Frost-free period:* 80 to 105 days

### Component Description

#### Clunton and similar soils

*Extent:* 85 percent of the map unit

*Geomorphic position:* Flood plains, flood-plain steps

*Slope:* 0 to 2 percent

*Surface layer texture:* Silty clay loam

*Restrictive feature:* None noted

*Drainage class:* Very poorly drained

*Parent material:* Fine-loamy alluvium over sandy and gravelly alluvium

*Native plant cover type:* Rangeland

*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 9.9 inches

### Additional Components

Clunton loam and similar soils: 5 percent of the unit

Cometcrik and similar soils: 4 percent of the unit

Dougcliff and similar soils: 3 percent of the unit

Meadowcreek and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 221A—Zatony clay loam, 0 to 2 percent slopes, wet

### Map Unit Setting

*Landscape:* Valleys, river valleys, uplands

*Elevation:* 3,800 to 5,400 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Zatony and similar soils

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, drainageways, flood-plain steps, terraces

*Slope:* 0 to 2 percent

*Surface layer texture:* Clay loam

*Restrictive feature:* None noted

*Drainage class:* Somewhat poorly drained

*Parent material:* Saline and sodic, clayey alluvium derived from shale-siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Water table:* Within a depth of 60 inches

*Salinity:* Saline within a depth of 30 inches

*Sodicity:* Sodic within a depth of 30 inches

*Available water capacity:* Mainly 4.4 inches

### Additional Components

Trudau and similar soils: 4 percent of the unit

Ethridge and similar soils: 3 percent of the unit

Ledger and similar soils: 3 percent of the unit

Moltoner and similar soils: 3 percent of the unit

Mckenton and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 231A—Ledger-Moltoner-Mckenton complex, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* River valleys, valleys

*Elevation:* 3,800 to 5,400 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Ledger and similar soils

*Extent:* 50 percent of the map unit

*Geomorphic position:* Drainageways, flood plains, flood-plain steps

*Slope:* 0 to 2 percent

*Surface layer texture:* Silty clay loam

*Restrictive feature:* None noted

*Drainage class:* Somewhat poorly drained

*Parent material:* Saline and sodic, clayey alluvium derived from shale-siltstone

*Native plant cover type:* Rangeland

*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches

*Salinity:* Saline within a depth of 30 inches

*Sodicity:* Sodic within a depth of 30 inches

*Available water capacity:* Mainly 6.4 inches

#### Moltoner and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Drainageways, flood plains, flood-plain steps

*Slope:* 0 to 2 percent

*Surface layer texture:* Silt loam

*Restrictive feature:* None noted

*Drainage class:* Poorly drained

*Parent material:* Saline and sodic, fine-loamy, stratified recent alluvium

*Native plant cover type:* Rangeland

*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Salinity:* Saline within a depth of 30 inches  
*Sodicity:* Sodic within a depth of 30 inches  
*Available water capacity:* Mainly 6.6 inches

#### **Mckenton and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Very poorly drained  
*Parent material:* Saline and sodic, clayey recent alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Salinity:* Saline within a depth of 30 inches  
*Sodicity:* Sodic within a depth of 30 inches  
*Available water capacity:* Mainly 6.3 inches

#### **Additional Components**

Wetsand and similar soils: 4 percent of the unit  
 Cardwell and similar soils: 3 percent of the unit  
 Riverrun and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **232A—Clunton-Wetsand-Bonebasin complex, 0 to 2 percent slopes**

#### **Map Unit Setting**

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 16 inches  
*Frost-free period:* 90 to 115 days

#### **Component Description**

##### **Clunton and similar soils**

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Silty clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Very poorly drained  
*Parent material:* Fine-loamy alluvium over sandy and gravelly alluvium  
*Native plant cover type:* Rangeland

*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 9.9 inches

#### **Wetsand and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Poorly drained  
*Parent material:* Loamy alluvium over sandy and gravelly recent alluvium derived from mixed igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Occasional  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 3.6 inches

#### **Bonebasin and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Very poorly drained  
*Parent material:* Organic material over fine-loamy alluvium and sandy and gravelly alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 5.6 inches

#### **Additional Components**

Meadowcreek and similar soils: 3 percent of the unit  
 Riverrun and similar soils: 3 percent of the unit  
 Cardwell and similar soils: 2 percent of the unit  
 Handke and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **233A—Ledger-Wetsand, saline, complex, 0 to 2 percent slopes**

#### **Map Unit Setting**

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,400 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Ledger and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Silt loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Saline and sodic, clayey alluvium derived from shale-siltstone  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Salinity:* Saline within a depth of 30 inches  
*Sodicity:* Sodic within a depth of 30 inches  
*Available water capacity:* Mainly 6.5 inches

#### Wetsand and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Poorly drained  
*Parent material:* Loamy alluvium over sandy and gravelly recent alluvium derived from mixed igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Salinity:* Saline within a depth of 30 inches  
*Available water capacity:* Mainly 3.2 inches

### Additional Components

Moltoner and similar soils: 5 percent of the unit  
 Cardwell and similar soils: 4 percent of the unit  
 Mckenton and similar soils: 4 percent of the unit  
 Riverrun and similar soils: 4 percent of the unit  
 Ryell and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 241E—Whitlash, very stony-Rock outcrop-Perma, stony, complex, 2 to 25 percent slopes

#### Map Unit Setting

*Landscape:* Uplands, foothills, mountains

*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Whitlash and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges  
*Slope:* 2 to 25 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly residuum derived from basalt  
     Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.3 inches

#### Rock outcrop

*Extent:* 20 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock. Boulders and stones make up a small part of the areas.

#### Perma and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
     Gravelly colluvium derived from basalt  
     Gravelly colluvium derived from metavolcanics  
     Gravelly slope alluvium derived from basalt  
     Gravelly slope alluvium derived from metavolcanics  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.4 inches

### Additional Components

Brickner and similar soils: 6 percent of the unit

Sawicki and similar soils: 5 percent of the unit  
Mocmont and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 241F—Whitlash, very stony-Rock outcrop-Perma, very stony, complex, 25 to 60 percent slopes

### Map Unit Setting

*Landscape:* Uplands, foothills  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Whitlash and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly residuum derived from basalt  
Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 0.9 inch

#### Rock outcrop

*Extent:* 25 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock. Boulders and stones make up a small part of the areas.

#### Perma and similar soils

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from basalt  
Gravelly colluvium derived from metavolcanics  
Gravelly slope alluvium derived from basalt  
Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.4 inches

### Additional Components

Sawicki and similar soils: 4 percent of the unit  
Brickner and similar soils: 3 percent of the unit  
Kadygulch and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 245E—Tolbert, very stony-Rock outcrop-Absarook, stony, complex, 8 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,200 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

### Component Description

#### Tolbert and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, interfluves, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly residuum derived from basalt  
Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.0 inch

### **Rock outcrop**

*Extent:* 30 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock. Boulders and stones make up a small part of the areas.

### **Absarook and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Hillsides, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium over residuum derived from sandstone

Residuum derived from basalt

Fine-loamy slope alluvium over residuum derived from basalt

Residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.0 inches

### **Additional Components**

Blaincreek and similar soils: 7 percent of the unit

Sawicki and similar soils: 5 percent of the unit

Brickner and similar soils: 4 percent of the unit

Work and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **251B—Cozberg sandy loam, 1 to 4 percent slopes, stony**

### **Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Cozberg and similar soils**

*Extent:* 95 percent of the map unit

*Geomorphic position:* Alluvial fans, terraces, valley floors

*Slope:* 1 to 4 percent

*Surface layer texture:* Sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Coarse-loamy alluvium over sandy and gravelly Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.2 inches

### **Additional Components**

Bronec and similar soils: 2 percent of the unit

Anamac and similar soils: 1 percent of the unit

Brocko and similar soils: 1 percent of the unit

Sixbeacon and similar soils: 1 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **251D—Cozberg sandy loam, 4 to 15 percent slopes, stony**

### **Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Cozberg and similar soils**

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, terraces, valley floors

*Slope:* 4 to 15 percent

*Surface layer texture:* Sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Coarse-loamy alluvium over sandy and gravelly Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.2 inches

### **Additional Components**

Anamac and similar soils: 5 percent of the unit

Bronec and similar soils: 4 percent of the unit

Brocko and similar soils: 3 percent of the unit  
 Rencot and similar soils: 2 percent of the unit  
 Varney and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 261D—Crago-Brocko complex, 4 to 15 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Crago and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, gravelly alluvium derived from limestone  
     Calcareous, gravelly colluvium derived from limestone  
     Calcareous, gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.3 inches

#### Brocko and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Silt loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Coarse-silty, calcareous alluvium  
     Coarse-silty, calcareous loess  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 11.8 inches

### Additional Components

Amesha and similar soils: 6 percent of the unit

Pensore and similar soils: 4 percent of the unit  
 Musselshell and similar soils: 3 percent of the unit  
 Cozberg and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 261E—Crago-Brocko complex, 15 to 60 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Crago and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, gravelly alluvium derived from limestone  
     Calcareous, gravelly colluvium derived from limestone  
     Calcareous, gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.3 inches

#### Brocko and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Silt loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Coarse-silty, calcareous alluvium  
     Coarse-silty, calcareous loess  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 11.8 inches

### Additional Components

Bronec and similar soils: 4 percent of the unit

Musselshell and similar soils: 4 percent of the unit  
 Pensore and similar soils: 4 percent of the unit  
 Walbert and similar soils: 4 percent of the unit  
 Amesha and similar soils: 3 percent of the unit  
 Rock outcrop: 3 percent of the unit  
 Shoddy and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 263D—Crago-Rock outcrop-Pensore complex, 4 to 25 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Crago and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, gravelly alluvium derived from limestone  
     Calcareous, gravelly colluvium derived from limestone  
     Calcareous, gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.3 inches

#### Rock outcrop

*Extent:* 25 percent of the map unit  
*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

#### Pensore and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, knolls, ridges, strath terraces  
*Slope:* 4 to 25 percent

*Surface layer texture:* Gravelly loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.4 inches

### Additional Components

Roto and similar soils: 8 percent of the unit  
 Crago soils that have slopes of more than 15 percent: 7 percent of the unit  
 Kalsted and similar soils: 3 percent of the unit  
 Amesha and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 263F—Crago, stony-Rock outcrop-Pensore, stony, complex, 25 to 60 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Crago, stony, and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, gravelly alluvium derived from limestone  
     Calcareous, gravelly colluvium derived from limestone  
     Calcareous, gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.2 inches

**Rock outcrop**

*Extent:* 30 percent of the map unit

*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

**Pensore and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, knolls, ridges, strath terraces

*Slope:* 25 to 60 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.4 inches

**Additional Components**

Crago soils that are not stony: 5 percent of the unit

Roto and similar soils: 4 percent of the unit

Kalsted and similar soils: 3 percent of the unit

Amesha and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**264C—Crago-Amesha complex, 2 to 8 percent slopes****Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

**Component Description****Crago and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains

*Slope:* 2 to 8 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly alluvium derived from limestone

Calcareous, gravelly colluvium derived from limestone

Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.3 inches

**Amesha and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 2 to 8 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 9.0 inches

**Additional Components**

Crago, stony, and similar soils: 6 percent of the unit

Kalsted and similar soils: 5 percent of the unit

Amesha, cobbly, and similar soils: 3 percent of the unit

Cozberg and similar soils: 3 percent of the unit

Sixbeacon and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**264D—Crago-Amesha complex, 8 to 15 percent slopes****Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

**Component Description****Crago and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains

*Slope:* 8 to 15 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly alluvium derived from limestone

Calcareous, gravelly colluvium derived from limestone

Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.3 inches

### **Amesha and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 8 to 15 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 9.0 inches

### **Additional Components**

Crago, stony, and similar soils: 5 percent of the unit

Kalsted and similar soils: 4 percent of the unit

Roto and similar soils: 3 percent of the unit

Sixbeacon and similar soils: 2 percent of the unit

Amesha, gravelly, and similar soils: 1 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **264E—Crago-Amesha complex, 15 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Crago and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains

*Slope:* 15 to 35 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly alluvium derived from limestone

Calcareous, gravelly colluvium derived from limestone

Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.3 inches

### **Amesha and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 15 to 35 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 9.0 inches

### **Additional Components**

Crago, stony, and similar soils: 5 percent of the unit

Amesha soils that have slopes of less than 15 percent: 4 percent of the unit

Kalsted and similar soils: 3 percent of the unit

Roto and similar soils: 2 percent of the unit

Sixbeacon and similar soils: 1 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **264F—Crago-Amesha complex, 35 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Crago and similar soils

*Extent:* 45 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains

*Slope:* 35 to 60 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly alluvium derived from limestone

Calcareous, gravelly colluvium derived from limestone

Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.3 inches

#### Amesha and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 35 to 60 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 9.0 inches

### Additional Components

Crago, very stony, and similar soils: 7 percent of the unit

Amesha, cobbly, and similar soils: 6 percent of the unit

Sixbeacon and similar soils: 3 percent of the unit

Pensore and similar soils: 2 percent of the unit

Rock outcrop: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 265B—Crago gravelly loam, 1 to 4 percent slopes, stony

#### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,500 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Crago and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains

*Slope:* 1 to 4 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly alluvium derived from limestone

Calcareous, gravelly colluvium derived from limestone

Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.3 inches

### Additional Components

Amesha and similar soils: 4 percent of the unit

Brocko and similar soils: 2 percent of the unit

Bronc and similar soils: 2 percent of the unit

Musselshell and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 265D—Crago gravelly loam, 4 to 15 percent slopes, stony

#### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,500 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Crago and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains

*Slope:* 4 to 15 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly colluvium derived from limestone

Calcareous, gravelly slope alluvium derived from limestone

Calcareous, gravelly alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.3 inches

### **Additional Components**

Amesha and similar soils: 3 percent of the unit

Crago, very stony, and similar soils: 3 percent of the unit

Musselshell and similar soils: 2 percent of the unit

Sixbeacon and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **265E—Crago very cobbly loam, 15 to 45 percent slopes, very stony**

### **Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,500 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Crago and similar soils**

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains

*Slope:* 15 to 45 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly alluvium derived from limestone

Calcareous, gravelly colluvium derived from limestone

Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

### **Additional Components**

Amesha and similar soils: 5 percent of the unit

Bronec and similar soils: 4 percent of the unit

Brocko and similar soils: 2 percent of the unit

Kalsted and similar soils: 2 percent of the unit

Musselshell and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **266D—Crago, stony-Crago complex, 4 to 15 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,500 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Crago, stony, and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains

*Slope:* 4 to 15 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly alluvium derived from limestone

Calcareous, gravelly colluvium derived from limestone

Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

#### **Crago and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains

*Slope:* 4 to 15 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly alluvium derived from limestone

Calcareous, gravelly colluvium derived from limestone

Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.3 inches

### **Additional Components**

Amesha and similar soils: 6 percent of the unit

Musselshell and similar soils: 5 percent of the unit

Cozberg and similar soils: 4 percent of the unit

Pensore and similar soils: 3 percent of the unit

Rock outcrop: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **266E—Crago, stony-Crago complex, 15 to 45 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,500 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Crago, stony, and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains

*Slope:* 15 to 45 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly alluvium derived from limestone

Calcareous, gravelly colluvium derived from limestone

Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

#### **Crago and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains

*Slope:* 15 to 45 percent

*Surface layer texture:* Very gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly alluvium derived from limestone

Calcareous, gravelly colluvium derived from limestone

Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

### **Additional Components**

Amesha and similar soils: 3 percent of the unit

Cozberg and similar soils: 3 percent of the unit

Musselshell and similar soils: 3 percent of the unit

Pensore and similar soils: 3 percent of the unit

Rock outcrop: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **267F—Crago, very stony-Pensore, stony-Rock outcrop complex, 25 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Crago and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains

*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

- Calcareous, gravelly alluvium derived from limestone
- Calcareous, gravelly colluvium derived from limestone
- Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 3.2 inches**Pensore and similar soils***Extent:* 25 percent of the map unit*Geomorphic position:* Escarpments, hillsides, knolls, ridges, strath terraces*Slope:* 25 to 60 percent*Surface layer texture:* Gravelly loam*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)*Drainage class:* Well drained*Parent material:* Gravelly residuum derived from limestone*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 1.4 inches**Rock outcrop***Extent:* 15 percent of the map unit*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.**Additional Components**

- Amesha and similar soils: 6 percent of the unit
- Brocko and similar soils: 5 percent of the unit
- Bronec and similar soils: 5 percent of the unit
- Sixbeacon and similar soils: 4 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**268C—Crago-Amesha cobbly loams, 2 to 8 percent slopes****Map Unit Setting***Landscape:* Uplands, valleys*Elevation:* 3,800 to 5,500 feet*Mean annual precipitation:* 10 to 14 inches*Frost-free period:* 90 to 115 days**Component Description****Crago and similar soils***Extent:* 55 percent of the map unit*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains*Slope:* 2 to 8 percent*Surface layer texture:* Cobbly loam*Restrictive feature:* None noted*Drainage class:* Well drained*Parent material:*

- Calcareous, gravelly alluvium derived from limestone
- Calcareous, gravelly colluvium derived from limestone
- Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 3.4 inches**Amesha and similar soils***Extent:* 30 percent of the map unit*Geomorphic position:* Alluvial fans, hillsides, knolls, plains*Slope:* 2 to 8 percent*Surface layer texture:* Cobbly loam*Restrictive feature:* None noted*Drainage class:* Well drained*Parent material:*

- Calcareous, coarse-loamy Tertiary valley fill alluvium
- Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 8.3 inches**Additional Components**

- Crago, stony, and similar soils: 5 percent of the unit
- Amesha soils that have slopes of more than 8 percent: 4 percent of the unit
- Musselshell and similar soils: 4 percent of the unit
- Sixbeacon and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**269D—Crago, very stony, and Crago, rubbly, soils, 2 to 15 percent slopes****Map Unit Setting***Landscape:* Uplands, valleys*Elevation:* 3,800 to 5,500 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### **Crago, very stony, and similar soils**

*Extent:* 65 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains

*Slope:* 2 to 15 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly alluvium derived from limestone

Calcareous, gravelly colluvium derived from limestone

Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

#### **Crago, rubbly, and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains

*Slope:* 2 to 15 percent

*Surface layer texture:* Stony loam

*Percent of surface covered by rock fragments:* 15 to 50 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly alluvium derived from limestone

Calcareous, gravelly colluvium derived from limestone

Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.0 inches

### Additional Components

Sieben and similar soils: 5 percent of the unit

Sixbeacon and similar soils: 3 percent of the unit

Vendome and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **271C—Bronec-Amesha complex, 2 to 8 percent slopes**

### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,500 feet

*Mean annual precipitation:* 10 to 17 inches

*Frost-free period:* 80 to 115 days

### Component Description

#### **Bronec and similar soils**

*Extent:* 55 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 2 to 8 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.3 inches

#### **Amesha and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 2 to 8 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 9.0 inches

### Additional Components

Bronec, very stony, and similar soils: 5 percent of the unit

Sappington and similar soils: 4 percent of the unit

Kalsted and similar soils: 3 percent of the unit

Geohrock and similar soils: 2 percent of the unit

Redfist and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 271D—Bronec-Amesha complex, 8 to 15 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Bronec and similar soils

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 8 to 15 percent

*Surface layer texture:* Cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.0 inches

#### Amesha and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 8 to 15 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.3 inches

### Additional Components

Amesha soils that have slopes of more than 15 percent: 5 percent of the unit

Bronec, stony, and similar soils: 5 percent of the unit

Geohrock and similar soils: 5 percent of the unit

Sappington and similar soils: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 271E—Bronec-Amesha complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Bronec and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 15 to 35 percent

*Surface layer texture:* Cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.0 inches

#### Amesha and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 15 to 35 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.3 inches

#### Bronec, very cobbly, and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 15 to 35 percent

*Surface layer texture:* Very cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.8 inches

### **Additional Components**

Bronec, very stony, and similar soils: 5 percent of the unit

Amesha soils that have slopes of more than 35 percent: 4 percent of the unit

Sappington and similar soils: 3 percent of the unit

Geohrock and similar soils: 2 percent of the unit

Cabbart and similar soils: 1 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **271F—Bronec-Amesha-Rock outcrop complex, 35 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Bronec and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 35 to 60 percent

*Surface layer texture:* Very cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.8 inches

### **Amesha and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 35 to 60 percent

*Surface layer texture:* Cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.3 inches

### **Rock outcrop**

*Extent:* 20 percent of the map unit

*Definition:* This component consists of outcroppings and exposures of Tertiary fill material on ridges and escarpments. Tertiary fill material consists of unconsolidated, stratified sediments.

### **Additional Components**

Bronec, very stony, and similar soils: 5 percent of the unit

Geohrock and similar soils: 3 percent of the unit

Sieben and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **272E—Bronec-Geohrock-Rock outcrop complex, 15 to 45 percent slopes**

### **Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Bronec and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 15 to 45 percent

*Surface layer texture:* Very cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.8 inches

### **Geohrock and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, terraces, valley floors

*Slope:* 15 to 45 percent

*Surface layer texture:* Cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly Tertiary valley fill alluvium

Gravelly slope alluvium

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.6 inches

### **Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists of outcroppings and exposures of Tertiary fill material on ridges and escarpments. Tertiary fill material consists of unconsolidated, stratified sediments.

### **Additional Components**

Bronec soils that have slopes of more than 45 percent: 5 percent of the unit

Amesha and similar soils: 4 percent of the unit

Cabbart and similar soils: 4 percent of the unit

Sieben and similar soils: 4 percent of the unit

Sappington and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **273D—Bronec-Shoddy-Amesha complex, 4 to 15 percent slopes**

### **Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,500 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Bronec and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 4 to 15 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.3 inches

#### **Shoddy and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Hills, knolls, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Silty clay loam

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

*Drainage class:* Well drained

*Parent material:*

Calcareous, clayey residuum derived from semiconsolidated shale-siltstone

Calcareous, clayey slope alluvium over residuum derived from semiconsolidated shale-siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.7 inches

#### **Amesha and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 4 to 15 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 9.0 inches

### **Additional Components**

Brocko and similar soils: 3 percent of the unit

Cabbart and similar soils: 2 percent of the unit

Kobarter and similar soils: 2 percent of the unit

Walbert and similar soils: 2 percent of the unit

Udecide and similar soils: 1 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **273E—Bronec-Shoddy-Amesha complex, 15 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,500 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Bronec and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 15 to 35 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.3 inches

#### **Shoddy and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Hills, knolls, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Silty clay loam

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

*Drainage class:* Well drained

*Parent material:*

Calcareous, clayey residuum derived from semiconsolidated shale-siltstone

Calcareous, clayey slope alluvium over residuum derived from semiconsolidated shale-siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.7 inches

### **Amesha and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 15 to 35 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 9.0 inches

### **Additional Components**

Brocko and similar soils: 5 percent of the unit

Cabbart and similar soils: 4 percent of the unit

Walbert and similar soils: 4 percent of the unit

Kobarter and similar soils: 3 percent of the unit

Udecide and similar soils: 2 percent of the unit

Varney and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **274A—Bronec complex, 0 to 2 percent slopes**

### **Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Bronec and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 0 to 2 percent

*Surface layer texture:* Very gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.8 inches

### **Bronec, very cobbly, and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 0 to 2 percent

*Surface layer texture:* Very cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.8 inches

### **Additional Components**

Bronec, stony, and similar soils: 6 percent of the unit

Geohrock and similar soils: 5 percent of the unit

Sieben and similar soils: 4 percent of the unit

Sappington and similar soils: 3 percent of the unit

Amesha and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **274C—Bronec complex, 2 to 8 percent slopes**

### **Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Bronec and similar soils**

*Extent:* 55 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 2 to 8 percent

*Surface layer texture:* Very gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.8 inches

#### **Bronec, very cobbly, and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 2 to 8 percent

*Surface layer texture:* Very cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.8 inches

### **Additional Components**

Bronec, very stony, and similar soils: 7 percent of the unit

Amesha and similar soils: 6 percent of the unit

Sappington and similar soils: 4 percent of the unit

Geohrock and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**274D—Bronec complex, 8 to 15 percent slopes****Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

**Component Description****Bronec and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 8 to 15 percent

*Surface layer texture:* Very gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.8 inches

**Bronec, very cobbly, and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 8 to 15 percent

*Surface layer texture:* Very cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.8 inches

**Additional Components**

Amesha and similar soils: 5 percent of the unit

Bronec, very stony, and similar soils: 5 percent of the unit

Rencot and similar soils: 4 percent of the unit

Geohrock and similar soils: 3 percent of the unit

Sixbeacon and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**274E—Bronec-Bronec, very stony, complex, 15 to 45 percent slopes****Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

**Component Description****Bronec and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 15 to 45 percent

*Surface layer texture:* Very gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.8 inches

**Bronec, very cobbly, and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 15 to 45 percent

*Surface layer texture:* Very cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.8 inches

**Bronec, very stony, and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 15 to 45 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.7 inches

**Additional Components**

Amesha and similar soils: 5 percent of the unit

Geohrock and similar soils: 3 percent of the unit

Sixbeacon and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**275A—Bronec gravelly loam, 1 to 4 percent slopes, stony****Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

**Component Description****Bronec and similar soils**

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 1 to 4 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.0 inches

**Additional Components**

Amesha and similar soils: 3 percent of the unit

Bronec, very stony, and similar soils: 3 percent of the unit

Bronec, very cobbly, and similar soils: 2 percent of the unit

Geohrock and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**275D—Bronec very gravelly loam, 4 to 15 percent slopes, very stony****Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

**Component Description****Bronec and similar soils**

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 4 to 15 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.7 inches

**Additional Components**

Amesha and similar soils: 3 percent of the unit

Bronec soils that have slopes of more than 15 percent:  
3 percent of the unit  
Geohrock and similar soils: 2 percent of the unit  
Sieben and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 275E—Bronec very gravelly loam, 15 to 35 percent slopes, very stony

### Map Unit Setting

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Bronec and similar soils

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
Sandy and gravelly, calcareous alluvium  
Sandy and gravelly, calcareous slope alluvium  
Sandy and gravelly, calcareous Tertiary valley fill alluvium  
Sandy and gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.7 inches

### Additional Components

Bronec soils that have slopes of more than 35 percent:  
5 percent of the unit  
Amesha and similar soils: 4 percent of the unit  
Geohrock and similar soils: 4 percent of the unit  
Sieben and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 276C—Bronec gravelly loam, 2 to 8 percent slopes, saline

### Map Unit Setting

*Landscape:* Valleys, uplands, river valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Bronec and similar soils

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
Sandy and gravelly, calcareous alluvium  
Sandy and gravelly, calcareous slope alluvium  
Sandy and gravelly, calcareous Tertiary valley fill alluvium  
Sandy and gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Salinity:* Saline within a depth of 30 inches  
*Sodicity:* Sodic within a depth of 30 inches  
*Available water capacity:* Mainly 4.0 inches

### Additional Components

Bronec, cobbly, and similar soils: 6 percent of the unit  
Trudau and similar soils: 5 percent of the unit  
Amesha and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 277C—Bronec-Amesha cobbly loams, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Bronec and similar soils

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 2 to 8 percent

*Surface layer texture:* Cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.0 inches

### **Amesha and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 2 to 8 percent

*Surface layer texture:* Cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.3 inches

### **Additional Components**

Bronec, very stony, and similar soils: 5 percent of the unit

Amesha soils that have slopes of more than 8 percent: 4 percent of the unit

Sappington and similar soils: 4 percent of the unit

Geohrock and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **278E—Bronec-Rencot-Rock outcrop complex, 15 to 45 percent slopes**

### **Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Bronec and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 15 to 45 percent

*Surface layer texture:* Very gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.8 inches

#### **Rencot and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, strath terraces

*Slope:* 15 to 45 percent

*Surface layer texture:* Very gravelly loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.4 inches

#### **Rock outcrop**

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard sedimentary and metamorphic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

### **Additional Components**

Bronec, very stony, and similar soils: 3 percent of the unit

Sixbeacon and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**291C—Sieben complex, 2 to 8 percent slopes****Map Unit Setting**

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,200 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

**Component Description****Sieben gravelly sandy loam and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Gravelly sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, gravelly Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.7 inches

**Sieben sandy loam and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, gravelly Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.7 inches

**Additional Components**

Chinook and similar soils: 5 percent of the unit  
 Cozberg and similar soils: 5 percent of the unit  
 Geohrock and similar soils: 5 percent of the unit  
 Varney and similar soils: 5 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**292C—Sieben-Varney cobbly loams, 2 to 8 percent slopes****Map Unit Setting**

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

**Component Description****Sieben and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Cobbly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, gravelly Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.8 inches

**Varney and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Cobbly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Fine-loamy slope alluvium derived from fine grained and coarse grained igneous rocks  
     Fine-loamy slope alluvium derived from semiconsolidated sandstone, siltstone, and shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 6.8 inches

**Additional Components**

Amesha and similar soils: 5 percent of the unit  
 Geohrock and similar soils: 5 percent of the unit  
 Sieben, stony, and similar soils: 5 percent of the unit  
 Varney soils that have slopes of more than 8 percent: 5 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**293D—Sieben cobbly loam, 4 to 15 percent slopes, stony****Map Unit Setting**

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Sieben and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 4 to 15 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, gravelly Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.8 inches

### Additional Components

Sieben, very stony, and similar soils: 3 percent of the unit

Bronec and similar soils: 2 percent of the unit

Udecide and similar soils: 2 percent of the unit

Varney and similar soils: 2 percent of the unit

Geohrock and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 294C—Sieben, stony-Sieberell, very stony, complex, 2 to 15 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Sieben and similar soils

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 2 to 15 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, gravelly Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.8 inches

#### Sieberell and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 2 to 15 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, gravelly slope alluvium over sandy and gravelly slope alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

### Additional Components

Sieben, very stony, and similar soils: 4 percent of the unit

Beaverell and similar soils: 3 percent of the unit

Sieben, bouldery, and similar soils: 3 percent of the unit

Bronec and similar soils: 2 percent of the unit

Varney and similar soils: 2 percent of the unit

Geohrock and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 295D—Sieben cobbly loam, 4 to 15 percent slopes, bouldery

### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Sieben and similar soils

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 4 to 15 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, gravelly Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.8 inches

### **Additional Components**

Sieben, very stony, and similar soils: 4 percent of the unit

Bronec and similar soils: 3 percent of the unit

Geohrock and similar soils: 3 percent of the unit

Amesha and similar soils: 2 percent of the unit

Udecide and similar soils: 2 percent of the unit

Varney and similar soils: 1 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **296D—Sieberell-Sieben-Beaverell complex, 4 to 15 percent slopes, stony**

### **Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Sieberell and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 4 to 15 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, gravelly slope alluvium over sandy and gravelly slope alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

#### **Sieben and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 4 to 15 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, gravelly Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.8 inches

### **Beaverell and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, plains

*Slope:* 4 to 15 percent

*Surface layer texture:* Very cobbly sandy clay loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Gravelly alluvium over sandy and gravelly alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.8 inches

### **Additional Components**

Geohrock and similar soils: 4 percent of the unit

Amesha and similar soils: 3 percent of the unit

Bronec and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **297D—Sieben, very stony-Sieben, rubbly, complex, 2 to 25 percent slopes**

### **Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Sieben, very stony, and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 2 to 25 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, gravelly Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.7 inches

### **Sieben, rubbly, and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 2 to 25 percent

*Surface layer texture:* Stony loam

*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, gravelly Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.9 inches

### **Additional Components**

Bronec and similar soils: 8 percent of the unit

Rencot and similar soils: 7 percent of the unit

Rock outcrop: 3 percent of the unit

Rubble land: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **297F—Sieben, rubbly-Sieben, very stony, complex, 15 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Sieben, rubbly, and similar soils**

*Extent:* 55 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 15 to 60 percent

*Surface layer texture:* Stony loam

*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, gravelly Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.9 inches

### **Sieben, very stony, and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 15 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, gravelly Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.7 inches

### **Additional Components**

Bronec and similar soils: 4 percent of the unit

Rencot and similar soils: 3 percent of the unit

Rock outcrop: 2 percent of the unit

Rubble land: 1 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **311D—Beenom, stony-Wimper-Whitlash, very stony, complex, 4 to 15 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, foothills

*Elevation:* 4,200 to 6,200 feet

*Mean annual precipitation:* 12 to 19 inches

*Frost-free period:* 80 to 105 days

### **Component Description**

#### **Beenom and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from hard, coarse grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.0 inches

#### **Wimper and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 4 to 15 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly colluvium derived from basalt

Calcareous, gravelly colluvium derived from fine grained sandstone

Calcareous, gravelly slope alluvium derived from basalt

Calcareous, gravelly slope alluvium derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.4 inches

#### **Whitlash and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Very channery coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.1 inches

#### **Additional Components**

Absarook and similar soils: 5 percent of the unit

Rock outcrop: 4 percent of the unit

Perma and similar soils: 3 percent of the unit

Zbart and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **311F—Beenom, stony-Wimper-Whitlash, very stony, complex, 15 to 45 percent slopes**

#### **Map Unit Setting**

*Landscape:* Uplands, foothills

*Elevation:* 4,200 to 6,200 feet

*Mean annual precipitation:* 12 to 19 inches

*Frost-free period:* 80 to 105 days

#### **Component Description**

##### **Beenom and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from hard, coarse grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.0 inches

##### **Wimper and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 15 to 45 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly colluvium derived from basalt

Calcareous, gravelly colluvium derived from fine grained sandstone

Calcareous, gravelly slope alluvium derived from basalt

Calcareous, gravelly slope alluvium derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.4 inches

##### **Whitlash and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Very channery coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.1 inches

### **Additional Components**

Absarook and similar soils: 6 percent of the unit  
 Perma and similar soils: 5 percent of the unit  
 Rock outcrop: 5 percent of the unit  
 Zbart and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **321A—Fairway-Meadowcreek complex, 0 to 2 percent slopes**

### **Map Unit Setting**

*Landscape:* Valleys, river valleys, uplands  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 17 inches  
*Frost-free period:* 80 to 115 days

### **Component Description**

#### **Fairway and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Flood plains, flood-plain steps, terraces  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Silt loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-loamy alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 10.6 inches

#### **Meadowcreek and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Drainageways, flood plains, flood-plain steps, terraces  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-loamy alluvium over sandy and gravelly alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 5.5 inches

### **Additional Components**

Faith and similar soils: 5 percent of the unit  
 Riverrun and similar soils: 4 percent of the unit  
 Clunton and similar soils: 3 percent of the unit  
 Handke and similar soils: 2 percent of the unit  
 Wetsand and similar soils: 1 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **322A—Fairway loam, 0 to 2 percent slopes**

### **Map Unit Setting**

*Landscape:* Valleys, river valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 16 inches  
*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Fairway and similar soils**

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Flood plains, flood-plain steps, terraces  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-loamy alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 10.6 inches

### **Additional Components**

Clunton and similar soils: 3 percent of the unit  
 Meadowcreek and similar soils: 3 percent of the unit

Cardwell and similar soils: 2 percent of the unit  
 Riverrun and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 323A—Fairway-Mckenton silt loams, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* Valleys, river valleys, uplands  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 17 inches  
*Frost-free period:* 80 to 115 days

### Component Description

#### Fairway and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Flood plains, flood-plain steps, terraces  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Silt loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-loamy alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 10.6 inches

#### Mckenton and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Silt loam  
*Restrictive feature:* None noted  
*Drainage class:* Very poorly drained  
*Parent material:* Saline and sodic, clayey recent alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Occasional  
*Water table:* Within a depth of 60 inches  
*Ponding duration:* Brief  
*Salinity:* Saline within a depth of 30 inches  
*Sodicity:* Sodic within a depth of 30 inches  
*Available water capacity:* Mainly 6.4 inches

### Additional Components

Meadowcreek and similar soils: 4 percent of the unit  
 Clunton and similar soils: 3 percent of the unit

Ledger and similar soils: 3 percent of the unit  
 Riverrun and similar soils: 3 percent of the unit  
 Faith and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 324A—Fairway clay loam, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* Valleys, river valleys, uplands  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 17 inches  
*Frost-free period:* 80 to 115 days

### Component Description

#### Fairway and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Flood plains, flood-plain steps, terraces  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-loamy alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 10.2 inches

### Additional Components

Meadowcreek and similar soils: 3 percent of the unit  
 Clunton and similar soils: 2 percent of the unit  
 Ledger and similar soils: 2 percent of the unit  
 Riverrun and similar soils: 2 percent of the unit  
 Faith and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 325A—Fairway-Nestley clay loams, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* Valleys, river valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Fairway and similar soils

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Flood plains, flood-plain steps, terraces  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-loamy alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 10.2 inches

#### Nestley and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Loamy alluvium over sandy and gravelly alluvium derived from fine grained igneous, sandstone, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 3.8 inches

### Additional Components

Meadowcreek and similar soils: 3 percent of the unit  
 Pieriver and similar soils: 3 percent of the unit  
 Cardwell and similar soils: 2 percent of the unit  
 Riverrun and similar soils: 2 percent of the unit

#### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 326A—Fairway-Moltoner complex, 0 to 2 percent slopes

#### Map Unit Setting

*Landscape:* Valleys, river valleys, uplands  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Fairway and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Flood plains, flood-plain steps, terraces  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-loamy alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 10.2 inches

#### Moltoner and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Silty clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Poorly drained  
*Parent material:* Saline and sodic, fine-loamy, stratified recent alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Salinity:* Saline within a depth of 30 inches  
*Sodicity:* Sodic within a depth of 30 inches  
*Available water capacity:* Mainly 6.6 inches

### Additional Components

Faith and similar soils: 5 percent of the unit  
 Nestley and similar soils: 4 percent of the unit  
 Ledger and similar soils: 3 percent of the unit  
 Mckenton and similar soils: 3 percent of the unit

#### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 327A—Faith loam, 0 to 2 percent slopes

#### Map Unit Setting

*Landscape:* River valleys, valleys, uplands  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 17 inches  
*Frost-free period:* 80 to 115 days

### Component Description

#### Faith and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, drainageways, flood-plain steps, terraces  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Moderately well drained  
*Parent material:* Fine-loamy alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 10.1 inches

### Additional Components

Cardwell and similar soils: 3 percent of the unit  
 Clunton and similar soils: 3 percent of the unit  
 Fairway and similar soils: 2 percent of the unit  
 Meadowcreek and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 328A—Faith loam, 0 to 2 percent slopes, cool

#### Map Unit Setting

*Landscape:* River valleys, valleys, uplands, foothills  
*Elevation:* 3,800 to 6,000 feet  
*Mean annual precipitation:* 10 to 19 inches  
*Frost-free period:* 80 to 115 days

### Component Description

#### Faith and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, drainageways, flood-plain steps, terraces  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Moderately well drained  
*Parent material:* Fine-loamy alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 10.1 inches

### Additional Components

Clunton and similar soils: 4 percent of the unit

Farnuf and similar soils: 3 percent of the unit  
 Martinsdale and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 329C—Faith-Slickens complex, 0 to 8 percent slopes, impacted

#### Map Unit Setting

*Landscape:* River valleys, valleys, uplands, foothills  
*Elevation:* 3,800 to 6,000 feet  
*Mean annual precipitation:* 10 to 19 inches  
*Frost-free period:* 80 to 115 days

### Component Description

#### Faith and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, drainageways, flood-plain steps, terraces  
*Slope:* 0 to 8 percent  
*Surface layer texture:* Sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Moderately well drained  
*Parent material:* Fine-loamy alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 8.3 inches

#### Slickens

*Extent:* 35 percent of the map unit  
*Definition:* Slickens are accumulations of fine textured material, such as material separated in placer-mine and ore-mill operations. Slickens from ore mills commonly consist of freshly ground rock that has undergone chemical treatment during the milling process.

### Additional Components

Breton and similar soils: 5 percent of the unit  
 Pieriver and similar soils: 5 percent of the unit  
 Wetsand and similar soils: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 331C—Geohrock-Bronec gravelly loams, 2 to 8 percent slopes

#### Map Unit Setting

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

#### Component Description

##### Geohrock and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, terraces, valley floors  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly Tertiary valley fill alluvium  
     Gravelly slope alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.6 inches

##### Bronec and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Sandy and gravelly, calcareous alluvium  
     Sandy and gravelly, calcareous slope alluvium  
     Sandy and gravelly, calcareous Tertiary valley fill alluvium  
     Sandy and gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 6.3 inches

#### Additional Components

Geohrock, stony, and similar soils: 5 percent of the unit  
 Bronec, very stony, and similar soils: 4 percent of the unit  
 Sappington and similar soils: 3 percent of the unit  
 Amesha and similar soils: 2 percent of the unit  
 Sieben and similar soils: 1 percent of the unit

#### Management

- For information about managing this map unit,

see the appropriate sections in Part II of this publication.

### 331D—Geohrock-Bronec gravelly loams, 8 to 15 percent slopes

#### Map Unit Setting

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

#### Component Description

##### Geohrock and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, terraces, valley floors  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly Tertiary valley fill alluvium  
     Gravelly slope alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.6 inches

##### Bronec and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Sandy and gravelly, calcareous alluvium  
     Sandy and gravelly, calcareous slope alluvium  
     Sandy and gravelly, calcareous Tertiary valley fill alluvium  
     Sandy and gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 6.3 inches

#### Additional Components

Geohrock, stony, and similar soils: 5 percent of the unit  
 Bronec, stony, and similar soils: 4 percent of the unit  
 Amesha and similar soils: 3 percent of the unit  
 Sappington and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 332D—Geohrock-Sappington complex, 4 to 15 percent slopes, stony

#### Map Unit Setting

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,200 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

#### Component Description

##### Geohrock and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, terraces, valley floors  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly Tertiary valley fill alluvium  
     Gravelly slope alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.6 inches

##### Sappington and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, coarse-loamy Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.2 inches

#### Additional Components

Bronec and similar soils: 5 percent of the unit  
 Amesha and similar soils: 4 percent of the unit  
 Rencot and similar soils: 3 percent of the unit

Sieben and similar soils: 2 percent of the unit  
 Varney and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 334D—Geohrock, stony-Bronec, very stony, complex, 4 to 15 percent slopes

#### Map Unit Setting

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

#### Component Description

##### Geohrock and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, terraces, valley floors  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Cobbly clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly Tertiary valley fill alluvium  
     Gravelly slope alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.6 inches

##### Bronec and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Sandy and gravelly, calcareous alluvium  
     Sandy and gravelly, calcareous slope alluvium  
     Sandy and gravelly, calcareous Tertiary valley fill alluvium  
     Sandy and gravelly colluvium

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.7 inches

### **Additional Components**

Geohrock soils that have slopes of more than 15 percent: 5 percent of the unit  
 Bronec soils that have slopes of more than 15 percent: 4 percent of the unit  
 Amesha and similar soils: 3 percent of the unit  
 Sappington and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **341A—Pieriver-Cardwell-Riverrun loams, 0 to 2 percent slopes**

### **Map Unit Setting**

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Pieriver and similar soils**

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-loamy recent alluvium derived from mixed rock sources  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 9.5 inches

#### **Cardwell and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-silty alluvium over sandy and gravelly alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 5.8 inches

### **Riverrun and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Moderately well drained  
*Parent material:* Sandy and gravelly recent alluvium derived from mixed igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 2.5 inches

### **Additional Components**

Nestley and similar soils: 4 percent of the unit  
 Wetsand and similar soils: 4 percent of the unit  
 Meadowcreek and similar soils: 3 percent of the unit  
 Bonebasin and similar soils: 2 percent of the unit  
 Mckenton and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **342A—Handke fine sandy loam, 0 to 2 percent slopes**

### **Map Unit Setting**

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,400 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Handke and similar soils**

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Fine sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Sandy alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 5.5 inches

### Additional Components

Cardwell and similar soils: 2 percent of the unit  
 Ledger and similar soils: 2 percent of the unit  
 Pieriver and similar soils: 2 percent of the unit  
 Riverrun and similar soils: 2 percent of the unit  
 Ryell and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 361D—Udecide-Varney-Walbert complex, 4 to 25 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Udecide and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Hillsides, interfluves, knolls  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Sandy clay loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic)  
*Drainage class:* Well drained  
*Parent material:*

Calcareous, fine-loamy residuum derived from semiconsolidated sandstone-siltstone

Calcareous, fine-loamy slope alluvium over residuum derived from semiconsolidated sandstone-siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.3 inches

#### Varney and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, terraces  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Sandy clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained

#### Parent material:

Fine-loamy slope alluvium derived from fine grained and coarse grained igneous rocks  
 Fine-loamy slope alluvium derived from semiconsolidated sandstone, siltstone, and shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 7.0 inches

### Walbert and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Hillsides, interfluves, ridges

*Slope:* 4 to 25 percent

*Surface layer texture:* Coarse sandy loam

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

*Drainage class:* Somewhat excessively drained

*Parent material:* Sandy residuum derived from semiconsolidated, coarse grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.0 inch

### Additional Components

Delpoint and similar soils: 3 percent of the unit  
 Ethridge and similar soils: 3 percent of the unit  
 Shoddy and similar soils: 3 percent of the unit  
 Anamac and similar soils: 2 percent of the unit  
 Brocko and similar soils: 2 percent of the unit  
 Cabbart and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 362C—Udecide-Varney sandy clay loams, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,200 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Udecide and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Hillsides, interfluves, knolls  
*Slope:* 2 to 8 percent

*Surface layer texture:* Sandy clay loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock  
 (paralithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, fine-loamy residuum derived from  
     semiconsolidated sandstone-siltstone  
     Calcareous, fine-loamy slope alluvium over  
     residuum derived from semiconsolidated  
     sandstone-siltstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.3 inches

#### **Varney and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls,  
 terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Sandy clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Fine-loamy slope alluvium derived from fine  
     grained and coarse grained igneous rocks  
     Fine-loamy slope alluvium derived from  
     semiconsolidated sandstone, siltstone, and  
     shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 7.0 inches

#### **Additional Components**

Udecide soils that have slopes of more than 8 percent:  
 6 percent of the unit  
 Varney soils that have slopes of more than 8 percent:  
 5 percent of the unit  
 Sappington and similar soils: 4 percent of the unit  
 Delpoint and similar soils: 3 percent of the unit  
 Amesha and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **371A—Havre-Ryell-Handke complex, 0 to 2 percent slopes**

#### **Map Unit Setting**

*Landscape:* River valleys, valleys, uplands  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 17 inches  
*Frost-free period:* 80 to 115 days

#### **Component Description**

##### **Havre and similar soils**

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains,  
 flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Loamy alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 9.6 inches

##### **Ryell and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains,  
 flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Coarse-loamy over sandy and  
 gravelly recent alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 5.7 inches

##### **Handke and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains,  
 flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Fine sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Sandy alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 5.5 inches

#### **Additional Components**

Riverrun and similar soils: 3 percent of the unit  
 Faith and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**372A—Havre loam, 0 to 2 percent slopes****Map Unit Setting**

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

**Component Description****Havre and similar soils**

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Loamy alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 9.6 inches

**Additional Components**

Handke and similar soils: 3 percent of the unit  
 Ryell and similar soils: 3 percent of the unit  
 Riverrun and similar soils: 2 percent of the unit  
 Trudau and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**381C—Kalsted gravelly sandy loam, 2 to 8 percent slopes****Map Unit Setting**

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

**Component Description****Kalsted and similar soils**

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Gravelly sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, coarse-loamy alluvium

Calcareous, coarse-loamy colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.8 inches

**Additional Components**

Amesha and similar soils: 3 percent of the unit  
 Chinook and similar soils: 3 percent of the unit  
 Cozberg and similar soils: 2 percent of the unit  
 Kalsted, stony, and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**382D—Kalsted gravelly sandy loam, 4 to 15 percent slopes, stony****Map Unit Setting**

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

**Component Description****Kalsted, stony, and similar soils**

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges, terraces  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Gravelly sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Calcareous, coarse-loamy Tertiary valley fill alluvium  
 Calcareous, coarse-loamy alluvium  
 Calcareous, coarse-loamy colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.3 inches

**Additional Components**

Bronec and similar soils: 3 percent of the unit  
 Cozberg and similar soils: 3 percent of the unit  
 Kalsted soils that are not stony: 3 percent of the unit

Amesha and similar soils: 2 percent of the unit  
 Crago and similar soils: 2 percent of the unit  
 Roto and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 391C—Musselshell-Crago gravelly loams, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Musselshell and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, plains  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Coarse-loamy alluvium derived from limestone  
     Coarse-loamy slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 6.6 inches

#### Crago and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, gravelly alluvium derived from limestone  
     Calcareous, gravelly colluvium derived from limestone  
     Calcareous, gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.3 inches

### Additional Components

Pensore and similar soils: 3 percent of the unit  
 Roto and similar soils: 3 percent of the unit  
 Amesha and similar soils: 2 percent of the unit  
 Rock outcrop: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 394B—Musselshell-Crago cobbly loams, 1 to 4 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Musselshell and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, plains  
*Slope:* 1 to 4 percent  
*Surface layer texture:* Cobbly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Coarse-loamy alluvium derived from limestone  
     Coarse-loamy slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 7.4 inches

#### Crago and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains  
*Slope:* 1 to 4 percent  
*Surface layer texture:* Cobbly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, gravelly alluvium derived from limestone  
     Calcareous, gravelly colluvium derived from limestone  
     Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.4 inches

#### **Additional Components**

Amesha and similar soils: 4 percent of the unit  
 Bronec and similar soils: 4 percent of the unit  
 Roto and similar soils: 4 percent of the unit  
 Sieben and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **401A—Moltoner silty clay loam, 0 to 2 percent slopes**

#### **Map Unit Setting**

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,400 feet  
*Mean annual precipitation:* 10 to 16 inches  
*Frost-free period:* 90 to 115 days

#### **Component Description**

##### **Moltoner and similar soils**

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Silty clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Poorly drained  
*Parent material:* Saline and sodic, fine-loamy, stratified recent alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Salinity:* Saline within a depth of 30 inches  
*Sodicity:* Sodic within a depth of 30 inches  
*Available water capacity:* Mainly 6.6 inches

#### **Additional Components**

Ledger and similar soils: 5 percent of the unit  
 Clunton and similar soils: 4 percent of the unit  
 Cardwell and similar soils: 3 percent of the unit  
 Wetsand and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **411A—Nestley loam, 0 to 2 percent slopes**

#### **Map Unit Setting**

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 16 inches  
*Frost-free period:* 90 to 115 days

#### **Component Description**

##### **Nestley and similar soils**

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Loamy alluvium over sandy and gravelly alluvium derived from fine grained igneous, sandstone, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 3.8 inches

#### **Additional Components**

Cardwell and similar soils: 3 percent of the unit  
 Riverrun and similar soils: 3 percent of the unit  
 Clunton and similar soils: 2 percent of the unit  
 Meadowcreek and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **413A—Nestley-Riverrun-Pieriver complex, 0 to 2 percent slopes**

#### **Map Unit Setting**

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,400 feet  
*Mean annual precipitation:* 10 to 16 inches  
*Frost-free period:* 90 to 115 days

#### **Component Description**

##### **Nestley and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Drainageways, flood plains, flood-plain steps

*Slope:* 0 to 2 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Somewhat poorly drained

*Parent material:* Loamy alluvium over sandy and gravelly alluvium derived from fine grained igneous, sandstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 3.8 inches

#### **Riverrun and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Drainageways, flood plains, flood-plain steps

*Slope:* 0 to 2 percent

*Surface layer texture:* Gravelly sandy loam

*Restrictive feature:* None noted

*Drainage class:* Moderately well drained

*Parent material:* Sandy and gravelly recent alluvium derived from mixed igneous, sedimentary, and metamorphic rocks

*Native plant cover type:* Rangeland

*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 2.1 inches

#### **Pieriver and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Drainageways, flood plains, flood-plain steps

*Slope:* 0 to 2 percent

*Surface layer texture:* Sandy loam

*Restrictive feature:* None noted

*Drainage class:* Somewhat poorly drained

*Parent material:* Fine-loamy recent alluvium derived from mixed rock sources

*Native plant cover type:* Rangeland

*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 9.1 inches

#### **Additional Components**

Mckenton and similar soils: 5 percent of the unit

Clunton and similar soils: 4 percent of the unit

Handke and similar soils: 3 percent of the unit

Ledger and similar soils: 3 percent of the unit

Ryell and similar soils: 3 percent of the unit

Moltoner and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

#### **421E—Perma, stony-Whitlash, very stony, complex, 15 to 35 percent slopes**

##### **Map Unit Setting**

*Landscape:* Uplands, foothills

*Elevation:* 4,400 to 6,500 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

##### **Component Description**

###### **Perma and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.1 inches

###### **Whitlash and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.3 inches

### **Additional Components**

Devilfence and similar soils: 4 percent of the unit  
 Whitlash, gravelly, and similar soils: 4 percent of the unit  
 Wilspring and similar soils: 4 percent of the unit  
 Rock outcrop: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **421F—Perma-Whitlash complex, 35 to 60 percent slopes, very stony**

### **Map Unit Setting**

*Landscape:* Uplands, foothills, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Perma and similar soils**

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*

Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.4 inches

#### **Whitlash and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

### **Additional Components**

Connieo and similar soils: 4 percent of the unit  
 Whitlash, gravelly, and similar soils: 4 percent of the unit  
 Baxton and similar soils: 3 percent of the unit  
 Breeton and similar soils: 2 percent of the unit  
 Rock outcrop: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **422F—Perma, very stony-Whitlash, very stony-Rock outcrop complex, 15 to 45 percent slopes, moist**

### **Map Unit Setting**

*Landscape:* Uplands, foothills, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Perma and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*

Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 4.4 inches

#### **Whitlash and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.1 inches

#### **Rock outcrop**

*Extent:* 20 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard sedimentary, metamorphic, and fine grained volcanic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

#### **Additional Components**

Connieo and similar soils: 5 percent of the unit  
 Baxton and similar soils: 4 percent of the unit  
 Breton and similar soils: 3 percent of the unit  
 Perma, stony, and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **423C—Wimper loam, 2 to 8 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

#### **Component Description**

#### **Wimper and similar soils**

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Calcareous, gravelly colluvium derived from basalt  
 Calcareous, gravelly colluvium derived from fine grained sandstone  
 Calcareous, gravelly slope alluvium derived from basalt  
 Calcareous, gravelly slope alluvium derived from fine grained sandstone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.6 inches

#### **Additional Components**

Clasoil and similar soils: 3 percent of the unit  
 Shawmut and similar soils: 3 percent of the unit  
 Farnuf and similar soils: 2 percent of the unit  
 Quaint and similar soils: 1 percent of the unit  
 Windham and similar soils: 1 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **423D—Wimper loam, 8 to 15 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

#### **Component Description**

#### **Wimper and similar soils**

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Calcareous, gravelly colluvium derived from basalt  
 Calcareous, gravelly colluvium derived from fine grained sandstone  
 Calcareous, gravelly slope alluvium derived from basalt  
 Calcareous, gravelly slope alluvium derived from fine grained sandstone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.6 inches

### Additional Components

Clasoil and similar soils: 3 percent of the unit  
 Shawmut and similar soils: 3 percent of the unit  
 Martinsdale and similar soils: 2 percent of the unit  
 Windham and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 423E—Wimper loam, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Wimper and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

- Calcareous, gravelly colluvium derived from basalt
- Calcareous, gravelly colluvium derived from fine grained sandstone
- Calcareous, gravelly slope alluvium derived from basalt
- Calcareous, gravelly slope alluvium derived from fine grained sandstone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.6 inches

### Additional Components

Maiden and similar soils: 3 percent of the unit  
 Windham and similar soils: 3 percent of the unit  
 Farnuf and similar soils: 2 percent of the unit  
 Martinsdale and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 424D—Wimper-Wimper, stony, complex, 4 to 15 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Wimper and similar soils

*Extent:* 55 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

- Calcareous, gravelly colluvium derived from basalt
- Calcareous, gravelly colluvium derived from fine grained sandstone
- Calcareous, gravelly slope alluvium derived from basalt
- Calcareous, gravelly slope alluvium derived from fine grained sandstone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.6 inches

#### Wimper, stony, and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

- Calcareous, gravelly colluvium derived from basalt
- Calcareous, gravelly colluvium derived from fine grained sandstone
- Calcareous, gravelly slope alluvium derived from basalt
- Calcareous, gravelly slope alluvium derived from fine grained sandstone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.4 inches

### Additional Components

Whitlash and similar soils: 3 percent of the unit  
 Farnuf and similar soils: 2 percent of the unit

Maiden and similar soils: 2 percent of the unit  
 Windham and similar soils: 2 percent of the unit  
 Rock outcrop: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 424E—Wimper-Wimper, stony, complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Wimper and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

- Calcareous, gravelly colluvium derived from basalt
- Calcareous, gravelly colluvium derived from fine grained sandstone
- Calcareous, gravelly slope alluvium derived from basalt
- Calcareous, gravelly slope alluvium derived from fine grained sandstone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.6 inches

#### Wimper, stony, and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

- Calcareous, gravelly colluvium derived from basalt
- Calcareous, gravelly colluvium derived from fine grained sandstone

Calcareous, gravelly slope alluvium derived from basalt

Calcareous, gravelly slope alluvium derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.4 inches

### Additional Components

Whitlash and similar soils: 4 percent of the unit  
 Farnuf and similar soils: 3 percent of the unit  
 Maiden and similar soils: 3 percent of the unit  
 Windham and similar soils: 3 percent of the unit  
 Rock outcrop: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 425E—Wimper gravelly loam, 8 to 35 percent slopes, stony

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Wimper, stony, and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

- Calcareous, gravelly colluvium derived from basalt
- Calcareous, gravelly colluvium derived from fine grained sandstone
- Calcareous, gravelly slope alluvium derived from basalt
- Calcareous, gravelly slope alluvium derived from fine grained sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.4 inches

### Additional Components

Maiden and similar soils: 3 percent of the unit

Wimper soils that are not stony: 3 percent of the unit  
 Farnuf and similar soils: 2 percent of the unit  
 Windham and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 426F—Wimper-Whitlash association, 35 to 60 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Wimper and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

- Calcareous, gravelly colluvium derived from basalt
- Calcareous, gravelly colluvium derived from fine grained sandstone
- Calcareous, gravelly slope alluvium derived from basalt
- Calcareous, gravelly slope alluvium derived from fine grained sandstone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.4 inches

#### Whitlash and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very cobbly loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*

- Gravelly residuum derived from basalt
- Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None  
*Available water capacity:* Mainly 0.9 inch

### Additional Components

Perma and similar soils: 4 percent of the unit  
 Windham and similar soils: 3 percent of the unit  
 Rock outcrop: 2 percent of the unit  
 Rubble land: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 427E—Perma-Whitlash complex, 15 to 35 percent slopes, bouldery

### Map Unit Setting

*Landscape:* Uplands, foothills  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Perma and similar soils

*Extent:* 70 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*

- Gravelly colluvium derived from basalt
- Gravelly colluvium derived from metavolcanics
- Gravelly slope alluvium derived from basalt
- Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.4 inches

#### Whitlash and similar soils

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

### Additional Components

Whitlash, very stony, and similar soils: 6 percent of the unit

Perma, very bouldery, and similar soils: 5 percent of the unit

Rock outcrop: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 429E—Perma, very stony-Perma, rubbly-Rock outcrop complex, 8 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Perma, very stony, and similar soils

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.4 inches

#### Perma, rubbly, and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Very stony loam

*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

### Rock outcrop

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard sedimentary and metamorphic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

### Additional Components

Castner and similar soils: 6 percent of the unit

Hilger and similar soils: 4 percent of the unit

Hilger, rubbly, and similar soils: 3 percent of the unit

Perma soils that have slopes of more than 35 percent: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 441F—Warneke-Warneke, very stony-Rock outcrop association, 8 to 60 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Warneke and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 8 to 60 percent

*Surface layer texture:* Extremely gravelly loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from limestone

Gravelly slope alluvium derived from limestone over residuum derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 0.7 inch

### **Warneke, very stony, and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 8 to 60 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from limestone

Gravelly slope alluvium derived from limestone over residuum derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 0.8 inch

### **Rock outcrop**

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

### **Additional Components**

Maiden, warm, and similar soils: 5 percent of the unit

Lap and similar soils: 4 percent of the unit

Whitecow and similar soils: 4 percent of the unit

Windham and similar soils: 4 percent of the unit

Maiden and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **451A—Geohrock cobbly clay loam, 1 to 4 percent slopes, stony**

### **Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Geohrock and similar soils**

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, terraces, valley floors

*Slope:* 1 to 4 percent

*Surface layer texture:* Cobbly clay loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly Tertiary valley fill alluvium

Gravelly slope alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.6 inches

### **Additional Components**

Bronec and similar soils: 3 percent of the unit

Sappington and similar soils: 3 percent of the unit

Bronec, stony, and similar soils: 2 percent of the unit

Sieben and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **461D—Absarook-Beenom complex, 2 to 15 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, foothills

*Elevation:* 4,400 to 6,200 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Absarook and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Hillsides, ridges

*Slope:* 2 to 15 percent  
*Surface layer texture:* Loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium over residuum derived from sandstone  
 Residuum derived from basalt  
 Fine-loamy slope alluvium over residuum derived from basalt  
 Residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.0 inches

#### **Beenom and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from hard, coarse grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.0 inches

#### **Additional Components**

Absarook, stony, and similar soils: 7 percent of the unit  
 Sawicki and similar soils: 6 percent of the unit  
 Blaincreek and similar soils: 4 percent of the unit  
 Rock outcrop: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

#### **471A—Cardwell-Pieriver complex, 0 to 2 percent slopes**

##### **Map Unit Setting**

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 16 inches  
*Frost-free period:* 90 to 115 days

##### **Component Description**

#### **Cardwell and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Flood plains, flood-plain steps

*Slope:* 0 to 2 percent  
*Surface layer texture:* Silty clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-silty alluvium over sandy and gravelly alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 6.0 inches

#### **Pieriver and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-loamy recent alluvium derived from mixed rock sources  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 9.5 inches

#### **Additional Components**

Riverrun and similar soils: 6 percent of the unit  
 Meadowcreek and similar soils: 5 percent of the unit  
 Clunton and similar soils: 4 percent of the unit  
 Absay and similar soils: 3 percent of the unit  
 Trudau and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

#### **481A—Riverrun gravelly sandy loam, 0 to 2 percent slopes**

##### **Map Unit Setting**

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

##### **Component Description**

#### **Riverrun and similar soils**

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Gravelly sandy loam

*Restrictive feature:* None noted  
*Drainage class:* Moderately well drained  
*Parent material:* Sandy and gravelly recent alluvium derived from mixed igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Occasional  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 2.1 inches

#### **Additional Components**

Ryell and similar soils: 5 percent of the unit  
 Handke and similar soils: 4 percent of the unit  
 Meadowcreek and similar soils: 3 percent of the unit  
 Wetsand and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **482A—Riverrun-Cardwell complex, 0 to 2 percent slopes**

#### **Map Unit Setting**

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 16 inches  
*Frost-free period:* 90 to 115 days

#### **Component Description**

##### **Riverrun and similar soils**

*Extent:* 55 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Moderately well drained  
*Parent material:* Sandy and gravelly recent alluvium derived from mixed igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 2.5 inches

##### **Cardwell and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Silty clay loam  
*Restrictive feature:* None noted

*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-silty alluvium over sandy and gravelly alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 6.0 inches

#### **Additional Components**

Pieriver and similar soils: 4 percent of the unit  
 Clunton and similar soils: 2 percent of the unit  
 Handke and similar soils: 2 percent of the unit  
 Nestley and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **483A—Riverrun, Handke, and Ryell soils, 0 to 2 percent slopes, channeled**

#### **Map Unit Setting**

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 17 inches  
*Frost-free period:* 80 to 115 days

#### **Component Description**

##### **Riverrun and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Gravelly sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Moderately well drained  
*Parent material:* Sandy and gravelly recent alluvium derived from mixed igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Frequent  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 2.1 inches

##### **Handke and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained

*Parent material:* Sandy alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Frequent  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 5.5 inches

#### **Ryell and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Coarse-loamy over sandy and gravelly recent alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Frequent  
*Available water capacity:* Mainly 5.6 inches

#### **Additional Components**

Clunton and similar soils: 2 percent of the unit  
 Meadowcreek and similar soils: 2 percent of the unit  
 Nestley and similar soils: 2 percent of the unit  
 Riverwash: 2 percent of the unit  
 Wetsand and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **492D—Roto-Pensore-Crago complex, 4 to 15 percent slopes**

#### **Map Unit Setting**

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

#### **Component Description**

##### **Roto and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Channery loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly slope alluvium over residuum derived from limestone  
*Native plant cover type:* Rangeland

*Flooding:* None  
*Available water capacity:* Mainly 2.6 inches

##### **Pensore and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, knolls, ridges, strath terraces  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.4 inches

##### **Crago and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Very gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

- Calcareous, gravelly alluvium derived from limestone
- Calcareous, gravelly colluvium derived from limestone
- Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.1 inches

#### **Additional Components**

Roto soils that have slopes of more than 15 percent: 5 percent of the unit  
 Crago, stony, and similar soils: 4 percent of the unit  
 Amesha and similar soils: 3 percent of the unit  
 Rock outcrop: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **492E—Roto-Pensore-Crago complex, 15 to 35 percent slopes**

#### **Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Roto and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very channery loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly slope alluvium over residuum derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.5 inches

#### Pensore and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, knolls, ridges, strath terraces  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.4 inches

#### Crago and similar soils

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, gravelly alluvium derived from limestone  
     Calcareous, gravelly colluvium derived from limestone  
     Calcareous, gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.1 inches

### Additional Components

Roto, stony, and similar soils: 5 percent of the unit  
 Amesha and similar soils: 4 percent of the unit  
 Crago, stony, and similar soils: 4 percent of the unit  
 Haxby and similar soils: 4 percent of the unit  
 Rock outcrop: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 492F—Roto-Pensore-Crago complex, 35 to 60 percent slopes, stony

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Roto and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very channery loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly slope alluvium over residuum derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.4 inches

#### Pensore and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, knolls, ridges, strath terraces  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from limestone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.4 inches

### **Crago and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, gravelly alluvium derived from limestone  
     Calcareous, gravelly colluvium derived from limestone  
     Calcareous, gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.2 inches

### **Additional Components**

Roto soils that have slopes of less than 35 percent: 5 percent of the unit  
 Crago soils that have slopes of less than 35 percent: 4 percent of the unit  
 Amesha and similar soils: 3 percent of the unit  
 Geohrock and similar soils: 2 percent of the unit  
 Rock outcrop: 1 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **493D—Pensore-Rock outcrop-Roto complex, 2 to 25 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Pensore and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, knolls, ridges, strath terraces  
*Slope:* 2 to 25 percent

*Surface layer texture:* Very gravelly loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)

*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from limestone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.3 inches

### **Rock outcrop**

*Extent:* 25 percent of the map unit  
*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

### **Roto and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Channery loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly slope alluvium over residuum derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.6 inches

### **Additional Components**

Crago and similar soils: 5 percent of the unit  
 Musselshell and similar soils: 4 percent of the unit  
 Amesha and similar soils: 3 percent of the unit  
 Brocko and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **511C—Haxby-Amesha-Rencot complex, 4 to 15 percent slopes**

### **Map Unit Setting**

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Haxby and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Hillsides, ridges, strath terraces

*Slope:* 4 to 15 percent

*Surface layer texture:* Loam

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

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy colluvium over gravelly residuum derived from basalt

Coarse-loamy colluvium over gravelly residuum derived from fine grained sandstone

Coarse-loamy slope alluvium over gravelly residuum derived from basalt

Coarse-loamy slope alluvium over gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.4 inches

#### **Amesha and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 4 to 15 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 9.0 inches

#### **Rencot and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, strath terraces

*Slope:* 4 to 15 percent

*Surface layer texture:* Gravelly loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.5 inches

#### **Additional Components**

Haxby soils that have slopes of more than 15 percent: 3 percent of the unit

Anamac and similar soils: 2 percent of the unit

Bronc and similar soils: 2 percent of the unit

Rencot soils that have slopes of more than 15 percent: 2 percent of the unit

Rock outcrop: 1 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **521A—Cardwell-Riverrun complex, 0 to 2 percent slopes**

#### **Map Unit Setting**

*Landscape:* River valleys, valleys, uplands

*Elevation:* 3,800 to 5,500 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

#### **Component Description**

##### **Cardwell and similar soils**

*Extent:* 60 percent of the map unit

*Geomorphic position:* Flood plains, flood-plain steps

*Slope:* 0 to 2 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Somewhat poorly drained

*Parent material:* Fine-silty alluvium over sandy and gravelly alluvium

*Native plant cover type:* Rangeland

*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 5.8 inches

##### **Riverrun and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Drainageways, flood plains, flood-plain steps

*Slope:* 0 to 2 percent

*Surface layer texture:* Gravelly sandy loam

*Restrictive feature:* None noted

*Drainage class:* Moderately well drained

*Parent material:* Sandy and gravelly recent alluvium derived from mixed igneous, sedimentary, and metamorphic rocks

*Native plant cover type:* Rangeland

*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 2.1 inches

### **Additional Components**

Havre and similar soils: 6 percent of the unit  
 Faith and similar soils: 5 percent of the unit  
 Nestley and similar soils: 3 percent of the unit  
 Pieriver and similar soils: 3 percent of the unit  
 Wetsand and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **522A—Ryell-Riverrun complex, 0 to 2 percent slopes**

### **Map Unit Setting**

*Landscape:* Valleys, river valleys  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 17 inches  
*Frost-free period:* 80 to 115 days

### **Component Description**

#### **Ryell and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Coarse-loamy over sandy and gravelly recent alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 5.7 inches

#### **Riverrun and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Very gravelly fine sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Moderately well drained  
*Parent material:* Sandy and gravelly recent alluvium derived from mixed igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 2.1 inches

### **Additional Components**

Havre and similar soils: 6 percent of the unit  
 Pieriver and similar soils: 6 percent of the unit  
 Cardwell and similar soils: 5 percent of the unit  
 Wetsand and similar soils: 5 percent of the unit  
 Clunton and similar soils: 4 percent of the unit  
 Nestley and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **523A—Cardwell-Riverrun-Pieriver complex, 0 to 2 percent slopes**

### **Map Unit Setting**

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 17 inches  
*Frost-free period:* 80 to 115 days

### **Component Description**

#### **Cardwell and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-silty alluvium over sandy and gravelly alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Occasional  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 5.6 inches

#### **Riverrun and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Gravelly sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Moderately well drained  
*Parent material:* Sandy and gravelly recent alluvium derived from mixed igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Occasional

*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 2.1 inches

#### **Pieriver and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-loamy recent alluvium derived from mixed rock sources  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Occasional  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 9.5 inches

#### **Additional Components**

Wetsand and similar soils: 8 percent of the unit  
 Handke and similar soils: 7 percent of the unit  
 Clunton and similar soils: 5 percent of the unit  
 Moltoner and similar soils: 3 percent of the unit  
 Nestley and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **524A—Cardwell loam, 0 to 2 percent slopes**

#### **Map Unit Setting**

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 17 inches  
*Frost-free period:* 80 to 115 days

#### **Component Description**

##### **Cardwell and similar soils**

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-silty alluvium over sandy and gravelly alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 5.8 inches

#### **Additional Components**

Pieriver and similar soils: 4 percent of the unit  
 Clunton and similar soils: 3 percent of the unit  
 Meadowcreek and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **525A—Cardwell-Riverrun complex, 0 to 2 percent slopes, saline**

#### **Map Unit Setting**

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,400 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

#### **Component Description**

##### **Cardwell and similar soils**

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-silty alluvium over sandy and gravelly alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Salinity:* Saline within a depth of 30 inches  
*Available water capacity:* Mainly 4.3 inches

##### **Riverrun and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Gravelly sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Moderately well drained  
*Parent material:* Sandy and gravelly recent alluvium derived from mixed igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Salinity:* Saline within a depth of 30 inches  
*Available water capacity:* Mainly 2.0 inches

### Additional Components

Trudau and similar soils: 5 percent of the unit  
 Wetsand and similar soils: 5 percent of the unit  
 Ledger and similar soils: 3 percent of the unit  
 Handke and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 531C—Sappington very cobbly clay loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,200 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Sappington and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Very cobbly clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, coarse-loamy Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 7.9 inches

### Additional Components

Amesha and similar soils: 2 percent of the unit  
 Bronec and similar soils: 2 percent of the unit  
 Geohrock and similar soils: 2 percent of the unit  
 Sappington, cobbly, and similar soils: 2 percent of the unit  
 Varney and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 532C—Sappington-Amesha complex, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,200 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Sappington and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, coarse-loamy Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.0 inches

#### Amesha and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, coarse-loamy Tertiary valley fill alluvium  
     Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.0 inches

### Additional Components

Sappington soils that have slopes of more than 8 percent: 4 percent of the unit  
 Amesha, cobbly, and similar soils: 3 percent of the unit  
 Brocko and similar soils: 3 percent of the unit  
 Varney and similar soils: 3 percent of the unit  
 Floweree and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 533A—Sappington clay loam, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Sappington and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 0 to 2 percent

*Surface layer texture:* Clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, coarse-loamy Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.0 inches

### Additional Components

Amesha and similar soils: 3 percent of the unit

Sappington soils that have slopes of more than 2 percent: 3 percent of the unit

Geohrock and similar soils: 2 percent of the unit

Varney and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 533C—Sappington clay loam, 2 to 8 percent slopes

#### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Sappington and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 2 to 8 percent

*Surface layer texture:* Clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, coarse-loamy Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.0 inches

### Additional Components

Amesha and similar soils: 3 percent of the unit

Sappington soils that have slopes of more than 8 percent: 3 percent of the unit

Geohrock and similar soils: 2 percent of the unit

Varney and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 533D—Sappington clay loam, 8 to 15 percent slopes

#### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Sappington and similar soils

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 8 to 15 percent

*Surface layer texture:* Clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, coarse-loamy Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.0 inches

### Additional Components

Amesha and similar soils: 5 percent of the unit

Geohrock and similar soils: 4 percent of the unit

Raghorn and similar soils: 3 percent of the unit

Varney and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 534C—Sappington-Geohrock complex, 2 to 8 percent slopes

#### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Sappington and similar soils

*Extent:* 45 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 2 to 8 percent

*Surface layer texture:* Gravelly clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, coarse-loamy Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 7.9 inches

#### Geohrock and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, terraces, valley floors

*Slope:* 2 to 8 percent

*Surface layer texture:* Cobbly clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly Tertiary valley fill alluvium

Gravelly slope alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.6 inches

### Additional Components

Amesha and similar soils: 4 percent of the unit

Bronec and similar soils: 4 percent of the unit

Geohrock, stony, and similar soils: 4 percent of the unit

Sappington soils that have slopes of more than 8 percent: 4 percent of the unit

Varney and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 534D—Sappington-Geohrock complex, 8 to 15 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Sappington and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, plains

*Slope:* 8 to 15 percent

*Surface layer texture:* Gravelly clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, coarse-loamy Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 7.9 inches

#### Geohrock and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, terraces, valley floors

*Slope:* 8 to 15 percent

*Surface layer texture:* Cobbly clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly Tertiary valley fill alluvium

Gravelly slope alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.6 inches

### Additional Components

Geohrock, stony, and similar soils: 5 percent of the unit

Sappington soils that have slopes of less than 8 percent: 5 percent of the unit

Varney and similar soils: 5 percent of the unit

Amesha and similar soils: 4 percent of the unit

Bronec and similar soils: 4 percent of the unit

Udecide and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 536A—Sappington-Amesha complex, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

**Component Description****Sappington and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Gravelly clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, coarse-loamy Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 7.9 inches

**Amesha and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, coarse-loamy Tertiary valley fill alluvium  
     Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.3 inches

**Additional Components**

Rothiemay and similar soils: 5 percent of the unit  
 Varney and similar soils: 4 percent of the unit  
 Bronec and similar soils: 2 percent of the unit  
 Geohrock and similar soils: 2 percent of the unit  
 Haxby and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**537B—Sappington loam, 1 to 4 percent slopes, stony****Map Unit Setting**

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

**Component Description****Sappington and similar soils**

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 1 to 4 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, coarse-loamy Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.2 inches

**Additional Components**

Sappington soils that have slopes of more than 4 percent: 4 percent of the unit  
 Amesha and similar soils: 2 percent of the unit  
 Bronec and similar soils: 2 percent of the unit  
 Geohrock and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**537D—Sappington loam, 4 to 15 percent slopes, stony****Map Unit Setting**

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,200 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

**Component Description****Sappington and similar soils**

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, coarse-loamy Tertiary valley fill alluvium

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.2 inches

### Additional Components

Amesha and similar soils: 5 percent of the unit  
 Bronec and similar soils: 4 percent of the unit  
 Geohrock and similar soils: 3 percent of the unit  
 Varney and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 538C—Sappington gravelly loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Sappington and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, coarse-loamy Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.0 inches

### Additional Components

Amesha and similar soils: 3 percent of the unit  
 Bronec and similar soils: 3 percent of the unit  
 Chinook and similar soils: 2 percent of the unit  
 Geohrock and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 539B—Sappington-Amesha complex, 2 to 8 percent slopes, cobbly

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,200 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Sappington and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Cobbly clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, coarse-loamy Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 7.9 inches

#### Amesha and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Cobbly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, coarse-loamy Tertiary valley fill alluvium  
     Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.3 inches

### Additional Components

Amesha soils that have slopes of more than 8 percent: 4 percent of the unit  
 Sappington, very cobbly, and similar soils: 4 percent of the unit  
 Bronec and similar soils: 3 percent of the unit  
 Varney and similar soils: 3 percent of the unit  
 Geohrock and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 539C—Sappington-Amesha complex, 2 to 8 percent slopes, stony

### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,200 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Sappington and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, coarse-loamy Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.2 inches

#### Amesha and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, coarse-loamy Tertiary valley fill alluvium  
     Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.3 inches

### Additional Components

Sappington soils that have slopes of more than 8 percent: 6 percent of the unit

Amesha soils that have slopes of more than 8 percent: 4 percent of the unit  
 Bronec and similar soils: 4 percent of the unit  
 Geohrock and similar soils: 3 percent of the unit  
 Varney and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 541D—Whitlash, very stony-Brickner, stony-Rock outcrop complex, 4 to 25 percent slopes

### Map Unit Setting

*Landscape:* Uplands, foothills  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Whitlash and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges  
*Slope:* 4 to 25 percent  
*Surface layer texture:* Very channery coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly residuum derived from basalt  
     Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.1 inches

#### Brickner and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 25 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from sandstone

*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 1.1 inches**Rock outcrop***Extent:* 20 percent of the map unit*Definition:* This component consists mainly of exposed areas of hard sedimentary and metamorphic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.**Additional Components**

Beenom and similar soils: 5 percent of the unit

Wickes and similar soils: 4 percent of the unit

Perma and similar soils: 3 percent of the unit

Wimper and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **541E—Whitlash, very stony-Brickner, stony-Rock outcrop complex, 25 to 60 percent slopes**

**Map Unit Setting***Landscape:* Uplands, foothills*Elevation:* 4,400 to 6,000 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 80 to 95 days**Component Description****Whitlash and similar soils***Extent:* 30 percent of the map unit*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges*Slope:* 25 to 60 percent*Surface layer texture:* Very channery coarse sandy loam*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)*Drainage class:* Well drained*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 0.8 inch**Brickner and similar soils***Extent:* 25 percent of the map unit*Geomorphic position:* Escarpments, hillsides, ridges*Slope:* 25 to 60 percent*Surface layer texture:* Gravelly sandy clay loam*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)*Drainage class:* Well drained*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from sandstone

*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 1.1 inches**Rock outcrop***Extent:* 25 percent of the map unit*Definition:* This component consists mainly of exposed areas of hard sedimentary and metamorphic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.**Additional Components**

Beenom and similar soils: 6 percent of the unit

Perma and similar soils: 5 percent of the unit

Shawmut and similar soils: 3 percent of the unit

Wickes and similar soils: 3 percent of the unit

Wimper and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **551E—Brickner, stony-Whitlash, very stony-Rock outcrop complex, 35 to 60 percent slopes**

**Map Unit Setting***Landscape:* Foothills, uplands*Elevation:* 4,400 to 6,000 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 80 to 95 days**Component Description****Brickner and similar soils***Extent:* 35 percent of the map unit*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Gravelly sandy clay loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.1 inches

### **Whitlash and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Very channery coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 0.8 inch

### **Rock outcrop**

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard sedimentary and metamorphic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

### **Additional Components**

Wickes and similar soils: 6 percent of the unit

Shawmut and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **552F—Brickner, very bouldery-Rock outcrop-Tolbert, very bouldery, association, 25 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, uplands, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Brickner and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.1 inches

#### **Rock outcrop**

*Extent:* 30 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock. Boulders and stones make up a small part of the areas.

#### **Tolbert and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, interfluves, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.0 inch

### **Additional Components**

Mocmont and similar soils: 6 percent of the unit

Blaincreek and similar soils: 5 percent of the unit

Shawmut and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **553F—Brickner, very stony-Wickes, very bouldery-Rock outcrop complex, 15 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, uplands, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Brickner and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.1 inches

#### **Wickes and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, interfluves, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt over residuum derived from basalt

Gravelly colluvium over residuum derived from sandstone

Gravelly slope alluvium over residuum derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.0 inches

### **Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

### **Additional Components**

Rubble land: 15 percent of the unit

Mocmont and similar soils: 5 percent of the unit

Shawmut and similar soils: 4 percent of the unit

Blaincreek and similar soils: 3 percent of the unit

Perma and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **554F—Brickner, very stony-Rock outcrop-Mocmont, stony, complex, 25 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, uplands, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Brickner and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.1 inches

### **Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

### **Mocmont and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, mountain slopes, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from fine grained sandstone

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from argillaceous limestone

Gravelly slope alluvium derived from fine grained sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

### **Additional Components**

Rubble land: 15 percent of the unit

Tolbert and similar soils: 7 percent of the unit

Blaincreek and similar soils: 6 percent of the unit

Roegulch and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **562C—Trudau-Bronec, saline, complex, 2 to 8 percent slopes**

### **Map Unit Setting**

*Landscape:* River valleys, valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

## **Component Description**

### **Trudau and similar soils**

*Extent:* 60 percent of the map unit

*Geomorphic position:* Alluvial fans, flood-plain steps, knolls, stream terraces, terraces

*Slope:* 2 to 8 percent

*Surface layer texture:* Silt loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Saline and sodic, fine-loamy alluvium derived from shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Salinity:* Saline within a depth of 30 inches

*Available water capacity:* Mainly 5.8 inches

### **Bronec, saline, and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 2 to 8 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Salinity:* Saline within a depth of 30 inches

*Sodicity:* Sodic within a depth of 30 inches

*Available water capacity:* Mainly 4.0 inches

### **Additional Components**

Bronec soils that are not saline: 6 percent of the unit

Amesha and similar soils: 5 percent of the unit

Sappington and similar soils: 5 percent of the unit

Geohrock and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **564C—Trudau-Benz clay loams, 2 to 8 percent slopes**

### **Map Unit Setting**

*Landscape:* River valleys, valleys, uplands

*Elevation:* 3,800 to 5,200 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Trudau and similar soils

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Alluvial fans, flood-plain steps, knolls, stream terraces, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Saline and sodic, fine-loamy alluvium derived from shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Salinity:* Saline within a depth of 30 inches  
*Sodicity:* Sodic within a depth of 30 inches  
*Available water capacity:* Mainly 5.9 inches

#### Benz and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Saline and sodic, fine-loamy alluvium derived from shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Salinity:* Saline within a depth of 30 inches  
*Sodicity:* Sodic within a depth of 30 inches  
*Available water capacity:* Mainly 6.8 inches

### Additional Components

Kobarter and similar soils: 3 percent of the unit  
 Varney and similar soils: 3 percent of the unit  
 Abor and similar soils: 2 percent of the unit  
 Absay and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 581E—Whitecow, stony-Warneke, very stony-Rock outcrop complex, 8 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Whitecow and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from limestone  
     Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 6.1 inches

#### Warneke and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly residuum derived from limestone  
     Gravelly slope alluvium derived from limestone over residuum derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 0.8 inch

#### Rock outcrop

*Extent:* 20 percent of the map unit  
*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

### Additional Components

Maiden and similar soils: 4 percent of the unit  
 Lap and similar soils: 3 percent of the unit  
 Shawmut and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit,

see the appropriate sections in Part II of this publication.

### **581F—Whitecow, very stony-Warneke, very stony-Rock outcrop complex, 35 to 70 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Whitecow and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 35 to 70 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from limestone

Gravelly slope alluvium derived from limestone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.9 inches

##### **Warneke and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 35 to 70 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from limestone

Gravelly slope alluvium derived from limestone over residuum derived from limestone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 0.8 inch

##### **Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

#### **Additional Components**

Lap and similar soils: 4 percent of the unit

Perma and similar soils: 3 percent of the unit

Shawmut and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **582E—Whitecow, bouldery-Shawmut, very bouldery-Rock outcrop complex, 15 to 45 percent slopes, warm**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

#### **Component Description**

##### **Whitecow and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Very channery loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from limestone

Gravelly slope alluvium derived from limestone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 6.0 inches

##### **Shawmut and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides

*Slope:* 15 to 45 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 5.2 inches**Rock outcrop***Extent:* 15 percent of the map unit*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.**Additional Components**

Warneke and similar soils: 6 percent of the unit

Whitecow soils that are not bouldery: 5 percent of the unit

Wimper and similar soils: 4 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**583E—Whitecow-Warneke complex, 8 to 35 percent slopes****Map Unit Setting***Landscape:* Foothills, uplands*Elevation:* 4,400 to 6,000 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 80 to 105 days**Component Description****Whitecow and similar soils***Extent:* 65 percent of the map unit*Geomorphic position:* Divides, escarpments, hillsides, ridges*Slope:* 8 to 35 percent*Surface layer texture:* Channery loam*Restrictive feature:* None noted*Drainage class:* Well drained*Parent material:*

Gravelly colluvium derived from limestone

Gravelly slope alluvium derived from limestone

*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 5.9 inches**Warneke and similar soils***Extent:* 25 percent of the map unit*Geomorphic position:* Divides, escarpments, hillsides, ridges*Slope:* 8 to 35 percent*Surface layer texture:* Very gravelly loam*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)*Drainage class:* Well drained*Parent material:*

Gravelly residuum derived from limestone

Gravelly slope alluvium derived from limestone over residuum derived from limestone

*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 0.8 inch**Additional Components**

Rock outcrop: 5 percent of the unit

Whitecow, stony, and similar soils: 3 percent of the unit

Wimper and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**584F—Whitecow-Whitecow, stony-Warneke complex, 25 to 60 percent slopes****Map Unit Setting***Landscape:* Foothills, uplands*Elevation:* 4,400 to 6,000 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 80 to 95 days**Component Description****Whitecow and similar soils***Extent:* 50 percent of the map unit*Geomorphic position:* Divides, escarpments, hillsides, ridges*Slope:* 25 to 60 percent*Surface layer texture:* Channery loam*Restrictive feature:* None noted*Drainage class:* Well drained*Parent material:*

Gravelly colluvium derived from limestone

Gravelly slope alluvium derived from limestone

*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 5.9 inches**Whitecow, stony, and similar soils***Extent:* 20 percent of the map unit*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 25 to 60 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from limestone  
 Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 6.0 inches

#### **Warneke and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Very gravelly loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from limestone  
 Gravelly slope alluvium derived from limestone over residuum derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 0.8 inch

#### **Additional Components**

Whitecow, gravelly, and similar soils: 6 percent of the unit  
 Windham and similar soils: 5 percent of the unit  
 Rock outcrop: 4 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **585E—Whitecow, bouldery-Shawmut, very bouldery-Rock outcrop complex, 15 to 45 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Whitecow and similar soils**

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very channery loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from limestone  
 Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 6.0 inches

##### **Shawmut and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 5.1 inches

##### **Rock outcrop**

*Extent:* 15 percent of the map unit  
*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

#### **Additional Components**

Warneke and similar soils: 6 percent of the unit  
 Whitecow, very gravelly, and similar soils: 5 percent of the unit  
 Windham and similar soils: 4 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 591F—Windham-Rock outcrop-Warneke complex, 35 to 60 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Windham and similar soils

*Extent:* 50 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Very gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from limestone

Gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.9 inches

#### Rock outcrop

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

#### Warneke and similar soils

*Extent:* 15 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Extremely gravelly loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from limestone

Gravelly slope alluvium derived from limestone over residuum derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 0.7 inch

### Additional Components

Whitecow and similar soils: 6 percent of the unit

Lap and similar soils: 5 percent of the unit

Maiden and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 631D—Rencot-Rock outcrop-Rencot, stony, complex, 8 to 25 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Rencot and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, strath terraces

*Slope:* 8 to 25 percent

*Surface layer texture:* Gravelly loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.5 inches

#### Rock outcrop

*Extent:* 30 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard sedimentary, metamorphic, and fine grained volcanic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

#### Rencot, stony, and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, strath terraces

*Slope:* 8 to 25 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.4 inches

### **Additional Components**

Bronec and similar soils: 4 percent of the unit

Geohrock and similar soils: 3 percent of the unit

Lahood and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **631E—Rencot-Rencot, very stony-Rock outcrop complex, 25 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Rencot and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, strath terraces

*Slope:* 25 to 60 percent

*Surface layer texture:* Very gravelly loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.4 inches

#### **Rencot, very stony, and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, strath terraces

*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.4 inches

### **Rock outcrop**

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard sedimentary, metamorphic, and fine grained volcanic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

### **Additional Components**

Bronec and similar soils: 5 percent of the unit

Geohrock and similar soils: 3 percent of the unit

Lahood and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **631F—Rencot-Bronec-Rock outcrop complex, 35 to 70 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Rencot and similar soils**

*Extent:* 55 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, strath terraces

*Slope:* 35 to 70 percent

*Surface layer texture:* Very gravelly loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.4 inches

**Bronec and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Very gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Sandy and gravelly, calcareous alluvium  
 Sandy and gravelly, calcareous slope alluvium  
 Sandy and gravelly, calcareous Tertiary valley fill alluvium  
 Sandy and gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.8 inches

**Rock outcrop**

*Extent:* 15 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard sedimentary, metamorphic, and fine grained volcanic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

**Additional Components**

Bronec soils that have slopes of less than 35 percent: 3 percent of the unit  
 Roto and similar soils: 3 percent of the unit  
 Amesha and similar soils: 2 percent of the unit  
 Geohrock and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**632C—Rencot-Lahood-Rock outcrop complex, 2 to 8 percent slopes****Map Unit Setting**

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

**Component Description****Rencot and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, strath terraces

*Slope:* 2 to 8 percent  
*Surface layer texture:* Very gravelly loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.4 inches

**Lahood and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, strath terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Gravelly loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium over residuum derived from basalt  
 Gravelly colluvium over residuum derived from fine grained sandstone  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone  
 Gravelly slope alluvium over residuum derived from basalt  
 Gravelly slope alluvium over residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.7 inches

**Rock outcrop**

*Extent:* 15 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard sedimentary, metamorphic, and fine grained volcanic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

**Additional Components**

Amesha and similar soils: 2 percent of the unit  
 Brocko and similar soils: 2 percent of the unit  
 Bronec and similar soils: 2 percent of the unit  
 Haxby and similar soils: 2 percent of the unit  
 Sieben and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 632D—Rencot-Lahood-Rock outcrop complex, 8 to 25 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Rencot and similar soils

*Extent:* 50 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, strath terraces

*Slope:* 8 to 25 percent

*Surface layer texture:* Very gravelly loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.4 inches

#### Lahood and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, strath terraces

*Slope:* 8 to 15 percent

*Surface layer texture:* Gravelly loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from basalt

Gravelly colluvium over residuum derived from fine grained sandstone

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

Gravelly slope alluvium over residuum derived from basalt

Gravelly slope alluvium over residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.7 inches

### Rock outcrop

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard sedimentary, metamorphic, and fine grained volcanic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

### Additional Components

Anamac and similar soils: 2 percent of the unit

Haxby and similar soils: 2 percent of the unit

Lahood, stony, and similar soils: 2 percent of the unit  
Rencot, very stony, and similar soils: 2 percent of the unit

Sixbeacon and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 632E—Rencot, very stony-Lahood, stony-Rock outcrop complex, 25 to 45 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Rencot and similar soils

*Extent:* 50 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, strath terraces

*Slope:* 25 to 45 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.4 inches

### **Lahood and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, strath terraces

*Slope:* 25 to 45 percent

*Surface layer texture:* Loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from basalt

Gravelly colluvium over residuum derived from fine grained sandstone

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

Gravelly slope alluvium over residuum derived from basalt

Gravelly slope alluvium over residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.7 inches

### **Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard sedimentary, metamorphic, and fine grained volcanic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

### **Additional Components**

Rencot soils that have slopes of more than 45 percent: 5 percent of the unit

Roto and similar soils: 4 percent of the unit

Bronec and similar soils: 3 percent of the unit

Varney and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **633D—Rencot, very stony-Bronec, very stony-Rock outcrop complex, 4 to 25 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Rencot and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, strath terraces

*Slope:* 4 to 25 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.4 inches

#### **Bronec and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors

*Slope:* 4 to 15 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly, calcareous alluvium

Sandy and gravelly, calcareous slope alluvium

Sandy and gravelly, calcareous Tertiary valley fill alluvium

Sandy and gravelly colluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.7 inches

**Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock. Boulders and stones make up a small part of the areas.

**Additional Components**

Lahood and similar soils: 7 percent of the unit  
 Sieben and similar soils: 6 percent of the unit  
 Sixbeacon and similar soils: 5 percent of the unit  
 Haxby and similar soils: 3 percent of the unit  
 Amesha and similar soils: 2 percent of the unit  
 Geohrock and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**634E—Rencot, very stony-Rock outcrop-Bronec, very stony, complex, 25 to 45 percent slopes****Map Unit Setting**

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

**Component Description****Rencot and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, strath terraces  
*Slope:* 25 to 45 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly residuum derived from basalt  
     Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.4 inches

**Rock outcrop**

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock. Boulders and stones make up a small part of the areas.

**Bronec and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors  
*Slope:* 25 to 45 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Sandy and gravelly, calcareous alluvium  
     Sandy and gravelly, calcareous slope alluvium  
     Sandy and gravelly, calcareous Tertiary valley fill alluvium  
     Sandy and gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.7 inches

**Additional Components**

Geohrock and similar soils: 6 percent of the unit  
 Bronec, stony, and similar soils: 5 percent of the unit  
 Cabbart and similar soils: 4 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**641C—Varney gravelly loam, 2 to 8 percent slopes****Map Unit Setting**

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,200 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

**Component Description****Varney and similar soils**

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy slope alluvium derived from fine grained and coarse grained igneous rocks

Fine-loamy slope alluvium derived from semiconsolidated sandstone, siltstone, and shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.7 inches

### Additional Components

Udecide and similar soils: 3 percent of the unit

Varney sandy clay loam and similar soils: 3 percent of the unit

Anamac and similar soils: 2 percent of the unit

Geohrock and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 642C—Varney clay loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Varney and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, terraces

*Slope:* 2 to 8 percent

*Surface layer texture:* Clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy slope alluvium derived from fine grained and coarse grained igneous rocks

Fine-loamy slope alluvium derived from semiconsolidated sandstone, siltstone, and shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 7.1 inches

### Additional Components

Raghorn and similar soils: 3 percent of the unit

Varney soils that have slopes of more than 8 percent: 3 percent of the unit

Sappington and similar soils: 2 percent of the unit

Sieben and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 642D—Varney clay loam, 8 to 15 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Varney and similar soils

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, terraces

*Slope:* 8 to 15 percent

*Surface layer texture:* Clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy slope alluvium derived from fine grained and coarse grained igneous rocks

Fine-loamy slope alluvium derived from semiconsolidated sandstone, siltstone, and shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 7.1 inches

### Additional Components

Anamac and similar soils: 5 percent

Udecide and similar soils: 4 percent

Abor and similar soils: 3 percent

Ethridge and similar soils: 3 percent

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 643A—Varney cobbly loam, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Varney and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, terraces

*Slope:* 0 to 2 percent

*Surface layer texture:* Cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy slope alluvium derived from fine grained and coarse grained igneous rocks

Fine-loamy slope alluvium derived from semiconsolidated sandstone, siltstone, and shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.8 inches

### Additional Components

Varney, stony, and similar soils: 4 percent of the unit

Sappington and similar soils: 3 percent of the unit

Sieben and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 643C—Varney cobbly loam, 2 to 8 percent slopes

#### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Varney and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, terraces

*Slope:* 2 to 8 percent

*Surface layer texture:* Cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy slope alluvium derived from fine grained and coarse grained igneous rocks

Fine-loamy slope alluvium derived from semiconsolidated sandstone, siltstone, and shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.8 inches

### Additional Components

Raghorn and similar soils: 2 percent of the unit

Sappington and similar soils: 2 percent of the unit

Sieben and similar soils: 2 percent of the unit

Udecide and similar soils: 2 percent of the unit

Varney, stony, and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 644C—Varney complex, 2 to 15 percent slopes, gullied

#### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Varney clay loam and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, terraces

*Slope:* 2 to 15 percent

*Surface layer texture:* Clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy slope alluvium derived from fine grained and coarse grained igneous rocks

Fine-loamy slope alluvium derived from semiconsolidated sandstone, siltstone, and shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 7.1 inches

#### Varney loam and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, terraces

*Slope:* 2 to 15 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy slope alluvium derived from fine grained and coarse grained igneous rocks  
 Fine-loamy slope alluvium derived from semiconsolidated sandstone, siltstone, and shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 7.2 inches

**Varney, gravelly, and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, terraces

*Slope:* 2 to 15 percent

*Surface layer texture:* Gravelly sandy clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy slope alluvium derived from fine grained and coarse grained igneous rocks  
 Fine-loamy slope alluvium derived from semiconsolidated sandstone, siltstone, and shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.8 inches

**Additional Components**

Sieben and similar soils: 4 percent of the unit

Cozberg and similar soils: 3 percent of the unit

Raghorn and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**645B—Varney-Sieben complex, 1 to 4 percent slopes, stony****Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

**Component Description****Varney and similar soils**

*Extent:* 55 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, terraces

*Slope:* 1 to 4 percent

*Surface layer texture:* Loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy slope alluvium derived from fine grained and coarse grained igneous rocks  
 Fine-loamy slope alluvium derived from semiconsolidated sandstone, siltstone, and shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 7.0 inches

**Sieben and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 1 to 4 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, gravelly Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.8 inches

**Additional Components**

Udecide and similar soils: 5 percent of the unit

Ethridge and similar soils: 4 percent of the unit

Anamac and similar soils: 2 percent of the unit

Cozberg and similar soils: 2 percent of the unit

Sieben, very stony, and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**645D—Varney, stony-Sieben, very stony, complex, 4 to 15 percent slopes****Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

**Component Description****Varney and similar soils**

*Extent:* 60 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls, terraces  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy slope alluvium derived from fine grained and coarse grained igneous rocks  
 Fine-loamy slope alluvium derived from semiconsolidated sandstone, siltstone, and shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 7.0 inches

#### **Sieben and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, gravelly Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.8 inches

#### **Additional Components**

Geohrock and similar soils: 2 percent of the unit  
 Sappington and similar soils: 2 percent of the unit  
 Sieben soils that have slopes of more than 15 percent: 2 percent of the unit  
 Udecide and similar soils: 2 percent of the unit  
 Varney soils that have slopes of more than 15 percent: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **645E—Varney, stony-Sieben, very stony, complex, 15 to 35 percent slopes**

#### **Map Unit Setting**

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,200 feet

*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

#### **Component Description**

##### **Varney and similar soils**

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, terraces  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy slope alluvium derived from fine grained and coarse grained igneous rocks  
 Fine-loamy slope alluvium derived from semiconsolidated sandstone, siltstone, and shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 7.0 inches

##### **Sieben and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, gravelly Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.8 inches

#### **Additional Components**

Amesha and similar soils: 5 percent of the unit  
 Bronec and similar soils: 4 percent of the unit  
 Varney soils that have slopes of less than 15 percent: 3 percent of the unit  
 Sieben soils that have slopes of less than 15 percent: 2 percent of the unit  
 Lahood and similar soils: 1 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 646C—Varney loam, 2 to 8 percent slopes, stony

### Map Unit Setting

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,200 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Varney and similar soils

*Extent:* 95 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy slope alluvium derived from fine grained and coarse grained igneous rocks  
 Fine-loamy slope alluvium derived from semiconsolidated sandstone, siltstone, and shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 7.0 inches

### Additional Components

Geohrock and similar soils: 2 percent of the unit  
 Varney soils that have slopes of more than 8 percent: 2 percent of the unit  
 Sappington and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 651C—Judell gravelly loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,000 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Judell and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium derived from limestone  
 Fine-loamy slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.3 inches

### Additional Components

Windham and similar soils: 4 percent of the unit  
 Maiden and similar soils: 3 percent of the unit  
 Judell, cobbly, and similar soils: 2 percent of the unit  
 Lap and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 652C—Judell cobbly loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

### Component Description

#### Judell and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Cobbly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium derived from limestone  
 Fine-loamy slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.4 inches

### Additional Components

Judell soils that have slopes of more than 8 percent: 4 percent of the unit  
 Martinsdale and similar soils: 3 percent of the unit  
 Windham and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 655C—Judell gravelly loam, 2 to 8 percent slopes, warm

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

### Component Description

#### Judell and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium derived from limestone  
 Fine-loamy slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.3 inches

### Additional Components

Judell soils that have slopes of more than 8 percent: 5 percent of the unit  
 Windham and similar soils: 3 percent of the unit  
 Maiden and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 662B—Judell gravelly loam, 1 to 4 percent slopes, very stony

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Judell and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 1 to 4 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from limestone

Fine-loamy slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 7.4 inches

### Additional Components

Windham and similar soils: 4 percent of the unit  
 Judell loam and similar soils: 3 percent of the unit  
 Maiden and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 691A—Meadowcreek, Clunton, and Cardwell soils, 0 to 2 percent slopes, channeled

### Map Unit Setting

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 17 inches  
*Frost-free period:* 80 to 115 days

### Component Description

#### Meadowcreek and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps, terraces  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-loamy alluvium over sandy and gravelly alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Occasional  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 5.5 inches

#### Clunton and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Flood plains, flood-plain steps  
*Slope:* 0 to 2 percent

*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Very poorly drained  
*Parent material:* Fine-loamy alluvium over sandy and gravelly alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Frequent  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 9.7 inches

#### **Cardwell and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Silty clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-silty alluvium over sandy and gravelly alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Occasional  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 6.0 inches

#### **Additional Components**

Mckenton and similar soils: 6 percent of the unit  
 Bonebasin and similar soils: 5 percent of the unit  
 Wetsand and similar soils: 5 percent of the unit  
 Moltoner and similar soils: 3 percent of the unit  
 Riverrun and similar soils: 3 percent of the unit  
 Ryell and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **692A—Meadowcreek-Nestley-Riverrun complex, 0 to 2 percent slopes**

#### **Map Unit Setting**

*Landscape:* River valleys, valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 16 inches  
*Frost-free period:* 90 to 115 days

#### **Component Description**

##### **Meadowcreek and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps, terraces

*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Fine-loamy alluvium over sandy and gravelly alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 5.5 inches

##### **Nestley and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:* Loamy alluvium over sandy and gravelly alluvium derived from fine grained igneous, sandstone, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 3.8 inches

##### **Riverrun and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Gravelly sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Moderately well drained  
*Parent material:* Sandy and gravelly recent alluvium derived from mixed igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 2.1 inches

#### **Additional Components**

Mckenton and similar soils: 4 percent of the unit  
 Clunton and similar soils: 3 percent of the unit  
 Ryell and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**713E—Raghorn-Ethridge-Kalsted complex, 15 to 35 percent slopes****Map Unit Setting**

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,200 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

**Component Description****Raghorn and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Fine-loamy alluvium over sandy alluvium derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 6.1 inches

**Ethridge and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, terraces  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Clayey alluvium derived from semiconsolidated, clayey shale  
     Clayey slope alluvium derived from semiconsolidated, clayey shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.5 inches

**Kalsted and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges, terraces  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, coarse-loamy Tertiary valley fill alluvium  
     Calcareous, coarse-loamy alluvium  
     Calcareous, coarse-loamy colluvium

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.9 inches

**Additional Components**

Bronec and similar soils: 4 percent of the unit  
 Amesha and similar soils: 3 percent of the unit  
 Ethridge soils that have slopes of less than 15 percent: 3 percent of the unit  
 Varney and similar soils: 3 percent of the unit  
 Cozberg and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**713F—Raghorn-Ethridge-Kalsted complex, 35 to 70 percent slopes****Map Unit Setting**

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,200 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

**Component Description****Raghorn and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Fine-loamy alluvium over sandy alluvium derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 6.1 inches

**Ethridge and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, terraces  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Clayey alluvium derived from semiconsolidated, clayey shale  
     Clayey slope alluvium derived from semiconsolidated, clayey shale

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.5 inches

#### **Kalsted and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges, terraces  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Calcareous, coarse-loamy Tertiary valley fill alluvium

Calcareous, coarse-loamy alluvium

Calcareous, coarse-loamy colluvium

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.9 inches

#### **Additional Components**

Bronec and similar soils: 5 percent of the unit  
 Amesha and similar soils: 4 percent of the unit  
 Cozberg and similar soils: 3 percent of the unit  
 Varney and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **721E—Zbart-Bondoe-Brocko complex, 4 to 25 percent slopes**

#### **Map Unit Setting**

*Landscape:* Uplands, valleys, foothills  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 17 inches  
*Frost-free period:* 80 to 115 days

#### **Component Description**

##### **Zbart and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, interfluves, ridges  
*Slope:* 4 to 25 percent  
*Surface layer texture:* Very channery loam  
*Depth to restrictive feature:* 5 to 10 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
 Gravelly residuum derived from claystone

Gravelly residuum derived from hard, fractured shale

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 0.8 inch

##### **Bondoe and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Alluvial fans  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Channery loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly alluvium derived from calcareous shale  
 Gravelly colluvium derived from clayey shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 6.8 inches

##### **Brocko and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Silt loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Coarse-silty, calcareous alluvium  
 Coarse-silty, calcareous loess  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 11.8 inches

#### **Additional Components**

Rock outcrop: 4 percent of the unit  
 Beenom and similar soils: 3 percent of the unit  
 Benz and similar soils: 3 percent of the unit  
 Crago and similar soils: 3 percent of the unit  
 Whitlash and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **731C—Martinsdale, stony-Martinsdale-Hilger complex, 2 to 8 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,200 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

## Component Description

### Martinsdale, stony, and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 2 to 8 percent

*Surface layer texture:* Loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, fine-loamy alluvium derived from granite

Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.0 inches

### Martinsdale and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 2 to 8 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, fine-loamy alluvium derived from granite

Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.0 inches

### Hilger and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides

*Slope:* 2 to 8 percent

*Surface layer texture:* Very cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from fine grained sandstone

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.2 inches

## Additional Components

Shawmut and similar soils: 6 percent of the unit

Absarook and similar soils: 4 percent of the unit

## Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 732D—Martinsdale-Shawmut, stony-Martinsdale, bouldery, complex, 4 to 25 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands, valleys

*Elevation:* 4,200 to 6,000 feet

*Mean annual precipitation:* 12 to 19 inches

*Frost-free period:* 80 to 105 days

## Component Description

### Martinsdale and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 4 to 15 percent

*Surface layer texture:* Cobbly clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, fine-loamy alluvium derived from granite

Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.0 inches

### Shawmut and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides

*Slope:* 4 to 25 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.6 inches

### **Martinsdale, bouldery, and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 4 to 25 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, fine-loamy alluvium derived from granite

Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.2 inches

### **Additional Components**

Windham and similar soils: 6 percent of the unit

Judell and similar soils: 5 percent of the unit

Crago and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **734D—Martinsdale loam, 4 to 15 percent slopes, very stony**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Martinsdale and similar soils**

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 4 to 15 percent

*Surface layer texture:* Loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, fine-loamy alluvium derived from granite

Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.2 inches

### **Additional Components**

Shawmut and similar soils: 5 percent of the unit  
Martinsdale soils that do not have stones on the surface: 4 percent of the unit

Tolbert and similar soils: 3 percent of the unit

Work and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **735C—Martinsdale-Absarook-Whitlash complex, 2 to 8 percent slopes, stony**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,200 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Martinsdale and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 2 to 8 percent

*Surface layer texture:* Loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, fine-loamy alluvium derived from granite

Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.2 inches

##### **Absarook and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Hillsides, ridges

*Slope:* 2 to 8 percent

*Surface layer texture:* Loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium over residuum derived from sandstone

Residuum derived from basalt

Fine-loamy slope alluvium over residuum derived from basalt

Residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.0 inches

#### **Whitlash and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges

*Slope:* 2 to 8 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.6 inches

#### **Additional Components**

Tolbert and similar soils: 5 percent of the unit

Rock outcrop: 4 percent of the unit

Hilger and similar soils: 3 percent of the unit

Shawmut and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **736C—Martinsdale-Work complex, 2 to 8 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,500 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Martinsdale and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 2 to 8 percent

*Surface layer texture:* Cobbly clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, fine-loamy alluvium derived from granite

Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.0 inches

##### **Work and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 2 to 8 percent

*Surface layer texture:* Clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, clayey alluvium derived from mixed igneous, sedimentary, and metamorphic rocks

Calcareous, gravelly outwash till

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.2 inches

#### **Additional Components**

Wilspring and similar soils: 4 percent of the unit

Quaint and similar soils: 3 percent of the unit

Windham and similar soils: 3 percent of the unit

Work, stony, and similar soils: 3 percent of the unit

Watne and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **742E—Shawmut, stony-Martinsdale, very stony, complex, 4 to 25 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Shawmut and similar soils

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides  
*Slope:* 15 to 25 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.6 inches

#### Martinsdale and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Calcareous, fine-loamy alluvium derived from granite  
 Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.2 inches

### Additional Components

Hilger and similar soils: 4 percent of the unit  
 Rock outcrop: 3 percent of the unit  
 Shawmut, bouldery, and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 744E—Shawmut, bouldery-Shawmut, stony-Tolbert, bouldery, complex, 15 to 35 percent slopes

#### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Shawmut, bouldery, and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.4 inches

#### Shawmut, stony, and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.6 inches

#### Tolbert and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, interfluves, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.0 inch

### **Additional Components**

Rock outcrop: 6 percent of the unit  
 Blaincreek and similar soils: 5 percent of the unit  
 Martinsdale and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **745D—Shawmut-Wickes-Gnojek complex, 2 to 15 percent slopes, bouldery**

### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Shawmut and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.4 inches

#### **Wickes and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, interfluves, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained

#### *Parent material:*

Gravelly colluvium derived from basalt over residuum derived from basalt  
 Gravelly colluvium over residuum derived from sandstone  
 Gravelly slope alluvium over residuum derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

### **Gnojek and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt  
 Gravelly residuum derived from sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.1 inches

### **Additional Components**

Rock outcrop: 4 percent of the unit  
 Martinsdale and similar soils: 3 percent of the unit  
 Wickes, cobbly, and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **745E—Shawmut, bouldery-Shawmut, very bouldery-Tolbert, bouldery, complex, 15 to 45 percent slopes, dry**

### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Shawmut, bouldery, and similar soils**

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides

*Slope:* 15 to 45 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.4 inches

#### **Shawmut, very bouldery, and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.4 inches

#### **Tolbert and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, interfluves, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.0 inch

#### **Additional Components**

Rock outcrop: 6 percent of the unit  
 Martinsdale and similar soils: 5 percent of the unit  
 Blaincreek and similar soils: 4 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

#### **746E—Shawmut-Tolbert complex, 8 to 35 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Shawmut and similar soils**

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.0 inches

##### **Tolbert and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, interfluves, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Cobbly loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.3 inches

#### **Additional Components**

Rock outcrop: 5 percent of the unit  
 Wickes and similar soils: 4 percent of the unit  
 Martinsdale and similar soils: 3 percent of the unit  
 Whitlash and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 747E—Shawmut, stony-Tolbert, very stony, complex, 15 to 35 percent slopes

#### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

#### Component Description

##### Shawmut and similar soils

*Extent:* 70 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides

*Slope:* 15 to 35 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.6 inches

##### Tolbert and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, interfluves, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

#### Additional Components

Wimper and similar soils: 5 percent of the unit

Martinsdale and similar soils: 3 percent of the unit

Rock outcrop: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 748E—Shawmut, stony-Wickes, very stony, complex, 15 to 45 percent slopes

#### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

#### Component Description

##### Shawmut and similar soils

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides

*Slope:* 15 to 45 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.7 inches

##### Wickes and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, interfluves, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt over residuum derived from basalt

Gravelly colluvium over residuum derived from sandstone

Gravelly slope alluvium over residuum derived from basalt

*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.0 inches

### Additional Components

Gnojek and similar soils: 6 percent of the unit  
 Rock outcrop: 5 percent of the unit  
 Brickner and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 751C—Sixbeacon gravelly sandy loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Sixbeacon and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, terraces, valley floors  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Gravelly sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, gravelly alluvium over sandy and gravelly Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.1 inches

### Additional Components

Cozberg and similar soils: 3 percent of the unit  
 Vendome and similar soils: 3 percent of the unit  
 Bronec and similar soils: 2 percent of the unit  
 Kalsted and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 752B—Sixbeacon-Vendome complex, 1 to 4 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Sixbeacon and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, terraces, valley floors  
*Slope:* 1 to 4 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, gravelly alluvium over sandy and gravelly Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.1 inches

#### Vendome and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, knolls, plains, terraces  
*Slope:* 1 to 4 percent  
*Surface layer texture:* Very cobbly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, gravelly alluvium over sandy and gravelly alluvium derived from mixed igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.3 inches

### Additional Components

Cozberg and similar soils: 5 percent of the unit  
 Bronec and similar soils: 4 percent of the unit  
 Chinook and similar soils: 3 percent of the unit  
 Sieben and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 753C—Sixbeacon-Cozberg complex, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Sixbeacon and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, terraces, valley floors  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Gravelly sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, gravelly alluvium over sandy and gravelly Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.1 inches

#### Cozberg and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, terraces, valley floors  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Coarse-loamy alluvium over sandy and gravelly Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.7 inches

### Additional Components

Bronec and similar soils: 6 percent of the unit  
 Anamac and similar soils: 5 percent of the unit  
 Vendome and similar soils: 5 percent of the unit  
 Sappington and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 754D—Sixbeacon-Cozberg, stony, complex, 4 to 15 percent slopes

#### Map Unit Setting

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Sixbeacon and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, terraces, valley floors

*Slope:* 4 to 15 percent

*Surface layer texture:* Cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, gravelly alluvium over sandy and gravelly Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

#### Cozberg and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, terraces, valley floors

*Slope:* 4 to 15 percent

*Surface layer texture:* Sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Coarse-loamy alluvium over sandy and gravelly Tertiary valley fill alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.2 inches

### Additional Components

Bronec and similar soils: 8 percent of the unit  
 Vendome and similar soils: 7 percent of the unit  
 Sieben and similar soils: 6 percent of the unit  
 Sieberell and similar soils: 4 percent of the unit  
 Chinook and similar soils: 3 percent of the unit  
 Amesha and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 755A—Vendome very cobbly loam, 0 to 4 percent slopes, very stony

#### Map Unit Setting

*Landscape:* Valley  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Vendome and similar soils

*Extent:* 95 percent of the map unit

*Geomorphic position:* Alluvial fans, knolls, plains, terraces  
*Slope:* 0 to 4 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, gravelly alluvium over sandy and gravelly alluvium derived from mixed igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.3 inches

#### **Additional Components**

Sixbeacon and similar soils: 3 percent of the unit  
 Cozberg and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **773F—Rock outcrop-Pensore association, 15 to 60 percent slopes**

#### **Map Unit Setting**

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

#### **Component Description**

##### **Rock outcrop**

*Extent:* 45 percent of the map unit  
*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

##### **Pensore and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, knolls, ridges, strath terraces  
*Slope:* 15 to 60 percent  
*Surface layer texture:* Very gravelly loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from limestone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.3 inches

#### **Additional Components**

Crago and similar soils: 5 percent of the unit  
 Roto and similar soils: 4 percent of the unit  
 Musselshell and similar soils: 3 percent of the unit  
 Pensore, stony, and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **774F—Rock outcrop-Whitlash, bouldery, association, 35 to 70 percent slopes**

#### **Map Unit Setting**

*Landscape:* Uplands, foothills, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Rock outcrop**

*Extent:* 45 percent of the map unit  
*Definition:* This component consists mainly of areas of exposed hard sedimentary, metamorphic, and fine grained volcanic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

##### **Whitlash and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly residuum derived from basalt  
     Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 0.9 inch

### Additional Components

Perma and similar soils: 8 percent of the unit  
 Mocmont and similar soils: 6 percent of the unit  
 Sawicki and similar soils: 6 percent of the unit  
 Blaincreek and similar soils: 5 percent of the unit  
 Brickner and similar soils: 5 percent of the unit  
 Wickes and similar soils: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 775F—Rock outcrop-Lap-Lap, very stony, association, 15 to 70 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,000 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Rock outcrop

*Extent:* 45 percent of the map unit  
*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

#### Lap and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 70 percent  
*Surface layer texture:* Very gravelly loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium over residuum derived from limestone  
     Gravelly residuum derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

#### Lap, very stony, and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 70 percent

*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium over residuum derived from limestone  
     Gravelly residuum derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.3 inches

### Additional Components

Maiden and similar soils: 4 percent of the unit  
 Castner and similar soils: 2 percent of the unit  
 Judell and similar soils: 2 percent of the unit  
 Windham and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 776D—Rock outcrop-Devilfence association, 2 to 25 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,500 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Rock outcrop

*Extent:* 45 percent of the map unit  
*Definition:* This component consists mainly of areas of exposed hard, fractured shale bedrock. Flagstones litter the areas and accumulate at the base of hills and escarpments.

#### Devilfence and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 2 to 25 percent  
*Surface layer texture:* Very channery loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:* Gravelly residuum derived from shale-siltstone  
*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

### **Additional Components**

Wilspring and similar soils: 6 percent of the unit

Quincreek and similar soils: 5 percent of the unit

Vigilante and similar soils: 5 percent of the unit

Deville and similar soils: 3 percent of the unit

Quaint and similar soils: 3 percent of the unit

Wilde and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **777E—Rock outcrop-Clugulch-Bobowic complex, 15 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Rock outcrop**

*Extent:* 40 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

#### **Clugulch and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Mountainsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Sandy loam

*Depth to restrictive feature:* 4 to 10 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 0.7 inch

#### **Bobowic and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Mountain slopes, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Sandy loam

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

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly alluvium over residuum derived from granite

Sandy and gravelly colluvium over residuum derived from granite

Sandy and gravelly residuum derived from granite

Sandy and gravelly slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.2 inches

### **Additional Components**

Tepecreek and similar soils: 5 percent of the unit

Caseypeak and similar soils: 4 percent of the unit

Hiore and similar soils: 3 percent of the unit

Peeler and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **777F—Rock outcrop-Clugulch-Bobowic complex, 35 to 70 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 40 to 70 days

### **Component Description**

#### **Rock outcrop**

*Extent:* 45 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

#### **Clugulch and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Mountainsides, ridges

*Slope:* 35 to 70 percent

*Surface layer texture:* Sandy loam

*Depth to restrictive feature:* 4 to 10 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 0.7 inch

**Bobowic and similar soils**

*Extent:* 10 percent of the map unit

*Geomorphic position:* Mountain slopes, ridges

*Slope:* 35 to 70 percent

*Surface layer texture:* Sandy loam

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

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly alluvium over residuum derived from granite

Sandy and gravelly colluvium over residuum derived from granite

Sandy and gravelly residuum derived from granite

Sandy and gravelly slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.2 inches

**Additional Components**

Tepecreek and similar soils: 5 percent of the unit

Caseypeak and similar soils: 4 percent of the unit

Hiore and similar soils: 3 percent of the unit

Peeler and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**778E—Rock outcrop-Kounter, very bouldery-Jeffcity, bouldery, complex, 15 to 45 percent slopes****Map Unit Setting**

*Landscape:* Foothills, uplands, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 12 to 19 inches

*Frost-free period:* 80 to 95 days

**Component Description****Rock outcrop**

*Extent:* 50 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

**Kounter and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Very cobbly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Somewhat excessively drained

*Parent material:*

Sandy and gravelly residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 0.8 inch

**Jeffcity and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.4 inches

**Additional Components**

Cedric and similar soils: 4 percent of the unit

Baxton and similar soils: 2 percent of the unit

Catgulch and similar soils: 2 percent of the unit

Placerton and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**781A—Vendome sandy loam, 0 to 8 percent slopes****Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,500 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

**Component Description****Vendome and similar soils**

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, knolls, plains, terraces  
*Slope:* 0 to 8 percent  
*Surface layer texture:* Sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, gravelly alluvium over sandy and gravelly alluvium derived from mixed igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.7 inches

#### **Additional Components**

Vendome and similar soils: 5 percent of the unit  
 Bronec and similar soils: 3 percent of the unit  
 Sixbeacon and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **782A—Vendome sandy loam, 0 to 8 percent slopes, stony**

#### **Map Unit Setting**

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

#### **Component Description**

##### **Vendome, stony, and similar soils**

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, knolls, plains, terraces  
*Slope:* 0 to 8 percent  
*Surface layer texture:* Sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, gravelly alluvium over sandy and gravelly alluvium derived from mixed igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.7 inches

#### **Additional Components**

Sixbeacon and similar soils: 4 percent of the unit  
 Bronec and similar soils: 3 percent of the unit  
 Vendome soils that are not stony: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **791C—Chinook sandy clay loam, 2 to 8 percent slopes, saline**

#### **Map Unit Setting**

*Landscape:* Valleys, uplands, river valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

#### **Component Description**

##### **Chinook, saline, and similar soils**

*Extent:* 95 percent of the map unit  
*Geomorphic position:* Alluvial fans, hills, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Sandy clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Coarse-loamy alluvium  
     Coarse-loamy eolian deposits  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Salinity:* Saline within a depth of 30 inches  
*Available water capacity:* Mainly 4.8 inches

#### **Additional Components**

Chinook soils that are not saline: 2 percent of the unit  
 Trudau and similar soils: 2 percent of the unit  
 Amesha and similar soils: 1 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **811C—Ethridge, saline-Zatony clay loams, 2 to 8 percent slopes**

#### **Map Unit Setting**

*Landscape:* Valleys, uplands, river valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

#### **Component Description**

##### **Ethridge, saline, and similar soils**

*Extent:* 55 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Clayey alluvium derived from semiconsolidated, clayey shale  
     Clayey slope alluvium derived from semiconsolidated, clayey shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Salinity:* Saline within a depth of 30 inches  
*Available water capacity:* Mainly 7.2 inches

#### **Zatony and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, drainageways, flood-plain steps, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Saline and sodic, clayey alluvium derived from shale-siltstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Salinity:* Saline within a depth of 30 inches  
*Sodicity:* Sodic within a depth of 30 inches  
*Available water capacity:* Mainly 4.4 inches

#### **Additional Components**

Trudau and similar soils: 4 percent of the unit  
 Ethridge soils that are not saline: 3 percent of the unit  
 Kobarter and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **821C—Rothiemay loam, 2 to 8 percent slopes**

#### **Map Unit Setting**

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

#### **Component Description**

#### **Rothiemay and similar soils**

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, knolls, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, fine-loamy Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.2 inches

#### **Additional Components**

Amesha and similar soils: 4 percent of the unit  
 Bronec and similar soils: 3 percent of the unit  
 Sappington and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **831E—Shoddy-Cabbart-Kobarter complex, 4 to 25 percent slopes**

#### **Map Unit Setting**

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

#### **Component Description**

#### **Shoddy and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Hills, knolls, ridges  
*Slope:* 8 to 25 percent  
*Surface layer texture:* Silty clay loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (paralithic)  
*Drainage class:* Well drained  
*Parent material:*

    Calcareous, clayey residuum derived from semiconsolidated shale-siltstone  
     Calcareous, clayey slope alluvium over residuum derived from semiconsolidated shale-siltstone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.7 inches

#### **Cabbart and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, hills, knolls  
*Slope:* 8 to 25 percent  
*Surface layer texture:* Loam

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

*Drainage class:* Well drained

*Parent material:*

Loamy residuum derived from semiconsolidated siltstone

Loamy slope alluvium over residuum derived from calcareous siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.7 inches

#### **Kobarter and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls

*Slope:* 4 to 15 percent

*Surface layer texture:* Clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Clayey slope alluvium derived from semiconsolidated shale-siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 9.2 inches

#### **Additional Components**

Amesha and similar soils: 5 percent of the unit

Brocko and similar soils: 4 percent of the unit

Bronec and similar soils: 3 percent of the unit

Walbert and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **832E—Shoddy-Rock outcrop-Delpoint complex, 2 to 25 percent slopes**

#### **Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

#### **Component Description**

##### **Shoddy and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Hills, knolls, ridges

*Slope:* 8 to 25 percent

*Surface layer texture:* Silty clay loam

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

*Drainage class:* Well drained

*Parent material:*

Calcareous, clayey residuum derived from semiconsolidated shale-siltstone

Calcareous, clayey slope alluvium over residuum derived from semiconsolidated shale-siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.7 inches

#### **Rock outcrop**

*Extent:* 25 percent of the map unit

*Definition:* This component consists of exposures of weakly consolidated sedimentary beds. These beds are primarily soft siltstone and sandstone. In places, harder layers of coarse grained sandstone cap the softer beds and form ledges. Cobble- and stone-sized fragments of sandstone accumulate at the base of escarpments and on fans at the base of hills.

#### **Delpoint and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, hills, knolls

*Slope:* 2 to 15 percent

*Surface layer texture:* Clay loam

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy alluvium over loamy residuum derived from semiconsolidated sandstone-siltstone

Fine-loamy residuum derived from semiconsolidated sandstone-siltstone

Fine-loamy slope alluvium over loamy residuum derived from semiconsolidated sandstone-siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.8 inches

#### **Additional Components**

Abor and similar soils: 6 percent of the unit

Ethridge and similar soils: 5 percent of the unit

Cabbart and similar soils: 4 percent of the unit

Amesha and similar soils: 3 percent of the unit

Brocko and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**841A—Clunton loam, 0 to 2 percent slopes****Map Unit Setting**

*Landscape:* River valleys, foothills, mountains, valleys

*Elevation:* 4,200 to 6,500 feet

*Mean annual precipitation:* 12 to 19 inches

*Frost-free period:* 80 to 105 days

**Component Description****Clunton and similar soils**

*Extent:* 85 percent of the map unit

*Geomorphic position:* Flood plains, flood-plain steps

*Slope:* 0 to 2 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Very poorly drained

*Parent material:* Fine-loamy alluvium over sandy and gravelly alluvium

*Native plant cover type:* Rangeland

*Frequency of flooding:* Frequent

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 9.7 inches

**Additional Components**

Cometcrik and similar soils: 5 percent of the unit

Meadowcreek and similar soils: 4 percent of the unit

Dougcliff and similar soils: 3 percent of the unit

Riverrun and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**851D—Walbert-Shoddy-Cabbart complex, 2 to 15 percent slopes****Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,500 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

**Component Description****Walbert and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Hillsides, interfluves, ridges

*Slope:* 2 to 15 percent

*Surface layer texture:* Coarse sandy loam

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

*Drainage class:* Somewhat excessively drained

*Parent material:* Sandy residuum derived from semiconsolidated, coarse grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.0 inch

**Shoddy and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Hills, knolls, ridges

*Slope:* 2 to 15 percent

*Surface layer texture:* Silty clay loam

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

*Drainage class:* Well drained

*Parent material:*

Calcareous, clayey residuum derived from semiconsolidated shale-siltstone

Calcareous, clayey slope alluvium over residuum derived from semiconsolidated shale-siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.7 inches

**Cabbart and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, hills, knolls

*Slope:* 2 to 15 percent

*Surface layer texture:* Loam

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

*Drainage class:* Well drained

*Parent material:*

Loamy residuum derived from semiconsolidated siltstone

Loamy slope alluvium over residuum derived from calcareous siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.7 inches

**Additional Components**

Udecide and similar soils: 5 percent of the unit

Varney and similar soils: 4 percent of the unit

Amesha and similar soils: 3 percent of the unit

Brocko and similar soils: 3 percent of the unit

Delpoint and similar soils: 3 percent of the unit

Bronec and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 851F—Walbert-Shoddy-Cabbart complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,500 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Walbert and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Hillsides, interfluves, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Coarse sandy loam

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

*Drainage class:* Somewhat excessively drained

*Parent material:* Sandy residuum derived from  
semiconsolidated, coarse grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.0 inch

#### Shoddy and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Hills, knolls, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Silty clay loam

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

*Drainage class:* Well drained

*Parent material:*

Calcareous, clayey residuum derived from  
semiconsolidated shale-siltstone

Calcareous, clayey slope alluvium over  
residuum derived from semiconsolidated shale-  
siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.7 inches

#### Cabbart and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Escarpments, hills, knolls

*Slope:* 15 to 35 percent

*Surface layer texture:* Gravelly loam

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

*Drainage class:* Well drained

*Parent material:*

Loamy residuum derived from semiconsolidated  
siltstone

Loamy slope alluvium over residuum derived from  
calcareous siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.4 inches

### Additional Components

Amesha and similar soils: 3 percent of the unit

Varney and similar soils: 3 percent of the unit

Bronc and similar soils: 2 percent of the unit

Sixbeacon and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 852C—Walbert sandy clay loam, 4 to 15 percent slopes

### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,500 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

### Component Description

#### Walbert and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Hillsides, interfluves, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Sandy clay loam

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

*Drainage class:* Somewhat excessively drained

*Parent material:* Sandy residuum derived from  
semiconsolidated, coarse grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

### Additional Components

Udecide and similar soils: 4 percent of the unit

Cabbart and similar soils: 3 percent of the unit

Varney and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**858E—Yetull-Yetull, stony, complex, 8 to 35 percent slopes****Map Unit Setting**

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

**Component Description****Yetull and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, hills  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Loamy fine sand  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*

Sandy eolian deposits  
 Sandy slope alluvium

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.6 inches

**Yetull, stony, and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, hills  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Gravelly loamy fine sand  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*

Sandy eolian deposits  
 Sandy slope alluvium

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.6 inches

**Additional Components**

Bronec and similar soils: 5 percent of the unit  
 Chinook and similar soils: 4 percent of the unit  
 Cozberg and similar soils: 3 percent of the unit  
 Sixbeacon and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**859C—Yetull loamy fine sand, 2 to 8 percent slopes****Map Unit Setting**

*Landscape:* Valleys, uplands  
*Elevation:* 4,200 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

**Component Description****Yetull and similar soils**

*Extent:* 95 percent of the map unit  
*Geomorphic position:* Alluvial fans, hills  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Loamy fine sand  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*

Sandy eolian deposits  
 Sandy slope alluvium

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.6 inches

**Additional Components**

Yetull, stony, and similar soils: 3 percent of the unit  
 Cozberg and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**872E—Kobarter-Abor, stony, complex, 15 to 35 percent slopes****Map Unit Setting**

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 5,200 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

**Component Description****Kobarter and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Gravelly clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained

*Parent material:* Clayey slope alluvium derived from semiconsolidated shale-siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 9.0 inches

#### **Abor and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Hills, knolls, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Gravelly clay

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Calcareous, clayey slope alluvium over residuum derived from semiconsolidated shale-siltstone

Calcareous, clayey residuum derived from semiconsolidated shale-siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.8 inches

#### **Additional Components**

Bronec and similar soils: 3 percent of the unit

Delpoint and similar soils: 3 percent of the unit

Ethridge and similar soils: 3 percent of the unit

Brocko and similar soils: 2 percent of the unit

Shoddy and similar soils: 2 percent of the unit

Varney and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **911C—Absarook-Martinsdale, stony, complex, 2 to 8 percent slopes**

#### **Map Unit Setting**

*Landscape:* Uplands, foothills

*Elevation:* 4,400 to 6,500 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

#### **Component Description**

##### **Absarook and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Hillsides, ridges

*Slope:* 2 to 8 percent

*Surface layer texture:* Gravelly loam

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium over residuum derived from sandstone

Residuum derived from basalt

Fine-loamy slope alluvium over residuum derived from basalt

Residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.9 inches

#### **Martinsdale and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 2 to 8 percent

*Surface layer texture:* Loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, fine-loamy alluvium derived from granite

Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.2 inches

#### **Additional Components**

Absarook loam and similar soils: 5 percent of the unit  
Martinsdale, very stony, and similar soils: 5 percent of the unit

Devilence and similar soils: 3 percent of the unit

Shawmut and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **915C—Quincreek channery loam, 2 to 8 percent slopes**

#### **Map Unit Setting**

*Landscape:* Uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Quincreek and similar soils

*Extent:* 95 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Channery loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, gravelly residuum derived from hard, red shale  
     Calcareous, gravelly slope alluvium over residuum derived from hard, red shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.8 inches

### Additional Components

Quaint and similar soils: 2 percent of the unit  
 Redfist and similar soils: 2 percent of the unit  
 Rock outcrop: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 941E—Tigeron, bouldery-Tigeron, very bouldery, complex, 15 to 45 percent slopes

#### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Tigeron, bouldery, and similar soils

*Extent:* 65 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, ridges, saddles  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Extremely gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from basalt  
     Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.3 inches

#### Tigeron, very bouldery, and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, ridges, saddles  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.4 inches

### Additional Components

Tigeron, very stony, and similar soils: 7 percent of the unit  
 Redfern and similar soils: 5 percent of the unit  
 Warwood and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 942E—Tigeron extremely gravelly loam, 15 to 35 percent slopes, bouldery

#### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Tigeron and similar soils

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, ridges, saddles  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Extremely gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

- Gravelly colluvium derived from basalt
- Gravelly colluvium derived from metavolcanics
- Gravelly slope alluvium derived from basalt
- Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.3 inches

### **Additional Components**

Tigeron, very stony, and similar soils: 7 percent of the unit

Warwood and similar soils: 5 percent of the unit

Redfern and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **943F—Tigeron, stony-Tigeron, very stony, complex, 25 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Tigeron, stony, and similar soils**

*Extent:* 60 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, ridges, saddles

*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

- Gravelly colluvium derived from basalt
- Gravelly colluvium derived from metavolcanics
- Gravelly slope alluvium derived from basalt
- Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.0 inches

### **Tigeron, very stony, and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, ridges, saddles

*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

- Gravelly colluvium derived from basalt
- Gravelly colluvium derived from metavolcanics
- Gravelly slope alluvium derived from basalt
- Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.0 inches

### **Additional Components**

Cowood and similar soils: 7 percent of the unit

Tigeron, extremely gravelly, and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **944E—Tigeron, very bouldery-Redfern, bouldery-Rock outcrop complex, 15 to 45 percent slopes, warm**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Tigeron and similar soils**

*Extent:* 55 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, ridges, saddles

*Slope:* 15 to 45 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from  
 metavolcanics

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.0 inches

**Redfern and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Divides, escarpments, mountain slopes, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.1 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

**Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock. Boulders and stones make up a small part of the areas.

**Additional Components**

Tigeron, very stony, and similar soils: 5 percent of the unit

Warwood and similar soils: 5 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **945E—Tigeron, very bouldery-Redfern, bouldery-Rock outcrop complex, 15 to 45 percent slopes, dry**

**Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

**Component Description****Tigeron and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, ridges, saddles

*Slope:* 15 to 45 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.0 inches

**Redfern and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Divides, escarpments, mountain slopes, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.1 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

**Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock. Boulders and stones make up a small part of the areas.

**Additional Components**

Tigeron soils that have slopes of more than 45 percent: 7 percent of the unit

Libeg and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**946F—Tigeron, very stony-Redfern,  
rubby-Rock outcrop complex, 25 to 60  
percent slopes**

**Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

**Component Description**

**Tigeron and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes,  
ridges, saddles

*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to  
3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from  
metavolcanics

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.0 inches

**Redfern and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Divides, escarpments, mountain  
slopes, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Very stony loam

*Percent of surface covered by rock fragments:* 15 to 50  
percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

**Rock outcrop**

*Extent:* 8 percent of the map unit

*Definition:* This component consists mainly of exposed  
areas of hard, fractured, fine grained volcanic  
extrusive bedrock.

**Additional Components**

Rubble land: 7 percent of the unit

Libeg and similar soils: 6 percent of the unit

Nieman and similar soils: 5 percent of the unit

Worock and similar soils: 4 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**947F—Tigeron, very stony-Redfern,  
rubby-Rock outcrop complex, 25 to 60  
percent slopes, dry**

**Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

**Component Description**

**Tigeron and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes,  
ridges, saddles

*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to  
3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from  
metavolcanics

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.0 inches

**Redfern and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Divides, escarpments, mountain  
slopes, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Very stony loam

*Percent of surface covered by rock fragments:* 15 to 50  
percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

### Rock outcrop

*Extent:* 8 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

### Additional Components

Rubble land: 7 percent of the unit

Libeg and similar soils: 6 percent of the unit

Nieman and similar soils: 5 percent of the unit

Worock and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 952F—Redfern, bouldery-Rock outcrop-Tigeron, very bouldery, complex, 25 to 60 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Redfern and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Divides, escarpments, mountain slopes, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.1 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

#### Rock outcrop

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of exposed

areas of hard, fractured, fine grained volcanic extrusive bedrock. Boulders and stones make up a small part of the areas.

### Tigeron and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, ridges, saddles

*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.0 inches

### Additional Components

Elve and similar soils: 4 percent of the unit

Cowood and similar soils: 2 percent of the unit

Libeg and similar soils: 2 percent of the unit

Nieman and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 953F—Redfern, rubbly-Rock outcrop-Rubble land association, 25 to 60 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Redfern and similar soils

*Extent:* 55 percent of the map unit

*Geomorphic position:* Divides, escarpments, mountain slopes, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Very stony loam

*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

#### **Rock outcrop**

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

#### **Rubble land**

*Extent:* 15 percent of the map unit

*Definition:* This component consists of extensive areas of hard, fine grained, angular volcanic cobbles, stones, and boulders.

#### **Additional Components**

Tigeron and similar soils: 4 percent of the unit

Elve and similar soils: 3 percent of the unit

Helmville and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **954F—Redfern, rubbly-Rock outcrop-Tigeron, very bouldery, complex, 35 to 70 percent slopes**

#### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 8,000 feet

*Mean annual precipitation:* 15 to 30 inches

*Frost-free period:* 30 to 70 days

#### **Component Description**

##### **Redfern and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Divides, escarpments, mountain slopes, ridges

*Slope:* 35 to 70 percent

*Surface layer texture:* Very stony loam

*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

#### **Rock outcrop**

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

#### **Tigeron and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, ridges, saddles

*Slope:* 35 to 70 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.0 inches

#### **Additional Components**

Tigeron soils that have slopes of less than 35 percent: 8 percent of the unit

Elve and similar soils: 7 percent of the unit

Rubble land: 5 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **963E—Elve-Warwood complex, 15 to 45 percent slopes, stony**

#### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 6,000 to 8,500 feet

*Mean annual precipitation:* 20 to 30 inches

*Frost-free period:* 30 to 60 days

#### **Component Description**

##### **Elve and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 2.4 inches

#### **Warwood and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 7.7 inches

#### **Additional Components**

Worock and similar soils: 6 percent of the unit  
 Cowood and similar soils: 4 percent of the unit  
 Rock outcrop: 3 percent of the unit  
 Rubble land: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **964E—Elve, very stony-Elve, rubbly-Cowood, rubbly, complex, 15 to 35 percent slopes**

#### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 6,500 to 8,500 feet  
*Mean annual precipitation:* 20 to 30 inches  
*Frost-free period:* 30 to 60 days

#### **Component Description**

##### **Elve, very stony, and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 2.2 inches

##### **Elve, rubbly, and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very stony loam  
*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 2.2 inches

##### **Cowood and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, mountainsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very stony loam  
*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from sandstone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 0.9 inch

### Additional Components

Worock and similar soils: 5 percent of the unit  
 Rock outcrop: 3 percent of the unit  
 Rubble land: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 964F—Elve, very stony-Cowood, rubbly-Rock outcrop complex, 35 to 60 percent slopes, cool

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 6,500 to 8,500 feet  
*Mean annual precipitation:* 20 to 30 inches  
*Frost-free period:* 30 to 60 days

### Component Description

#### Elve and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
     Gravelly colluvium derived from basalt  
     Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 2.2 inches

#### Cowood and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, mountainsides, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very stony loam  
*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly residuum derived from basalt  
     Gravelly residuum derived from sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

### Rock outcrop

*Extent:* 10 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

### Additional Components

Rubble land: 10 percent of the unit  
 Worock and similar soils: 10 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 965E—Elve, very stony-Cowood, rubbly, complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Elve and similar soils

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
     Gravelly colluvium derived from basalt  
     Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 2.2 inches

#### Cowood and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, mountainsides, ridges  
*Slope:* 15 to 35 percent

*Surface layer texture:* Very stony loam  
*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from sandstone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 0.9 inch

### **Additional Components**

Rock outcrop: 5 percent of the unit  
 Rubble land: 5 percent of the unit  
 Worock and similar soils: 5 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **965F—Elve, very stony-Cowood, rubbly-Rock outcrop complex, 35 to 60 percent slopes, dry**

### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Elve and similar soils**

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 2.2 inches

#### **Cowood and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Escarpments, mountainsides, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very stony loam  
*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from sandstone  
*Flooding:* None  
*Available water capacity:* Mainly 0.9 inch

### **Rock outcrop**

*Extent:* 8 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

### **Additional Components**

Rubble land: 7 percent of the unit  
 Worock and similar soils: 7 percent of the unit  
 Elvick and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **966E—Elve, very stony-Rock outcrop-Rubble land complex, 8 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 8,500 feet  
*Mean annual precipitation:* 15 to 30 inches  
*Frost-free period:* 30 to 70 days

### **Component Description**

#### **Elve and similar soils**

*Extent:* 70 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from basalt  
Gravelly slope alluvium derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.2 inches

**Rock outcrop**

*Extent:* 10 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

**Rubble land**

*Extent:* 10 percent of the map unit

*Definition:* This component consists of extensive areas of hard, fine grained, angular volcanic cobbles, stones, and boulders.

**Additional Components**

Cowood and similar soils: 4 percent of the unit

Elvick and similar soils: 3 percent of the unit

Worock and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**967F—Elve, very stony-Cowood, rubbly-Rock outcrop complex, 35 to 60 percent slopes****Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 6,500 to 8,500 feet

*Mean annual precipitation:* 20 to 30 inches

*Frost-free period:* 30 to 60 days

**Component Description****Elve and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 35 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from basalt  
Gravelly slope alluvium derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.2 inches

**Cowood and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, mountainsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Very stony loam

*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

**Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

**Additional Components**

Rubble land: 10 percent of the unit

Worock and similar soils: 10 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**968E—Elve, stony-Worock complex, 15 to 35 percent slopes****Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

**Component Description****Elve and similar soils**

*Extent:* 55 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 15 to 35 percent

*Surface layer texture:* Loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 2.6 inches

#### **Worock and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics  
 Gravelly till derived from fine grained igneous and metamorphic rocks  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 5.7 inches

#### **Additional Components**

Cowood and similar soils: 3 percent of the unit  
 Elvick and similar soils: 3 percent of the unit  
 Rock outcrop: 2 percent of the unit  
 Rubble land: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **968F—Elve, stony-Worock complex, 35 to 60 percent slopes**

#### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

#### **Component Description**

#### **Elve and similar soils**

*Extent:* 55 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 2.6 inches

#### **Worock and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics  
 Gravelly till derived from fine grained igneous and metamorphic rocks  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 5.7 inches

#### **Additional Components**

Cowood and similar soils: 4 percent of the unit  
 Rock outcrop: 3 percent of the unit  
 Rubble land: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **969F—Elve, bouldery-Worock-Rock outcrop complex, 35 to 60 percent slopes**

#### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Elve and similar soils

*Extent:* 45 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 35 to 60 percent

*Surface layer texture:* Stony loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.4 inches

#### Worock and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 35 to 60 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

Gravelly till derived from fine grained igneous and metamorphic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.7 inches

#### Rock outcrop

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock. Boulders and stones make up a small part of the areas.

### Additional Components

Cowood and similar soils: 5 percent of the unit

### Management

- For information about managing this map unit,

see the appropriate sections in Part II of this publication.

### 971F—Cowood, rubbly-Rock outcrop association, 25 to 60 percent slopes

#### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 8,500 feet

*Mean annual precipitation:* 15 to 30 inches

*Frost-free period:* 30 to 70 days

### Component Description

#### Cowood and similar soils

*Extent:* 50 percent of the map unit

*Geomorphic position:* Escarpments, mountainsides, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Very stony loam

*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

#### Rock outcrop

*Extent:* 30 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard sedimentary and metamorphic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

### Additional Components

Elve and similar soils: 6 percent of the unit

Tigeron and similar soils: 5 percent of the unit

Arrowpeak and similar soils: 3 percent of the unit

Redfern and similar soils: 3 percent of the unit

Sigbird and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**972F—Cowood, very bouldery-Kimpton,  
very bouldery-Rock outcrop complex,  
15 to 45 percent slopes**

**Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

**Component Description**

**Cowood and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, mountainsides, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly residuum derived from basalt  
Gravelly residuum derived from sandstone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.1 inches

**Kimpton and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly colluvium over residuum derived from basalt  
Gravelly colluvium over residuum derived from fine grained sandstone  
Gravelly residuum derived from basalt  
Gravelly residuum derived from fine grained sandstone  
Gravelly slope alluvium over residuum derived from basalt  
Gravelly slope alluvium over residuum derived from fine grained sandstone  
*Native plant cover type:* Forest land

*Flooding:* None  
*Available water capacity:* Mainly 3.2 inches

**Rock outcrop**

*Extent:* 20 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard sedimentary and metamorphic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

**Additional Components**

Surdal and similar soils: 5 percent of the unit  
Tigeron and similar soils: 4 percent of the unit  
Redfern and similar soils: 3 percent of the unit  
Tiban and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**973D—Cowood, very stony-Elve, very  
stony-Rock outcrop complex, 4 to 25  
percent slopes**

**Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 8,500 feet  
*Mean annual precipitation:* 15 to 30 inches  
*Frost-free period:* 30 to 70 days

**Component Description**

**Cowood and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, mountainsides, ridges  
*Slope:* 4 to 25 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent covered by stones; 15 to 50 percent covered by boulders  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly residuum derived from basalt  
Gravelly residuum derived from sandstone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.0 inch

**Elve and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 4 to 25 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 2.2 inches

**Rock outcrop**

*Extent:* 10 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

**Additional Components**

Rubble land: 10 percent of the unit  
 Arrowpeak and similar soils: 6 percent of the unit  
 Tigeron and similar soils: 4 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**982F—Kimpton, very bouldery-Rock outcrop-Tiban, very bouldery, complex, 25 to 50 percent slopes****Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

**Component Description****Kimpton and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 25 to 50 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from basalt  
 Gravelly colluvium over residuum derived from fine grained sandstone  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone  
 Gravelly slope alluvium over residuum derived from basalt  
 Gravelly slope alluvium over residuum derived from fine grained sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

**Rock outcrop**

*Extent:* 25 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard sedimentary and metamorphic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

**Tiban and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 25 to 50 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.7 inches

**Additional Components**

Cheadle and similar soils: 6 percent of the unit  
 Helmville and similar soils: 5 percent of the unit  
 Ratiopeak and similar soils: 4 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**991E—Libeg loam, 15 to 35 percent slopes, bouldery****Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

**Component Description****Libeg and similar soils**

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly alluvium  
 Gravelly colluvium  
 Gravelly slope alluvium  
 Gravelly till  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 4.9 inches

**Additional Components**

Monaberg and similar soils: 10 percent of the unit  
 Elvick and similar soils: 5 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**992E—Libeg, very bouldery-Libeg, bouldery-Nieman, bouldery, complex, 15 to 45 percent slopes****Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 30 inches  
*Frost-free period:* 30 to 70 days

**Component Description****Libeg, very bouldery, and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly alluvium  
 Gravelly colluvium  
 Gravelly slope alluvium  
 Gravelly till  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.3 inches

**Libeg, bouldery, and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly alluvium  
 Gravelly colluvium  
 Gravelly slope alluvium  
 Gravelly till  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.3 inches

**Nieman and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, mountain slopes, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.0 inch

### Additional Components

Ratiopeak and similar soils: 2 percent of the unit  
 Sebud and similar soils: 2 percent of the unit  
 Surdal and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 993D—Ratiopeak-Tiban gravelly loams, 4 to 15 percent slopes, bouldery

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Ratiopeak and similar soils

*Extent:* 55 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from sandstone  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.4 inches

#### Tiban and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.0 inches

### Additional Components

Cheadle and similar soils: 5 percent of the unit  
 Rock outcrop: 3 percent of the unit  
 Kimpton and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 994E—Libeg, stony-Nieman, bouldery, complex, 15 to 45 percent slopes

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Libeg and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly alluvium  
 Gravelly colluvium  
 Gravelly slope alluvium  
 Gravelly till

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.3 inches

#### Nieman and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, mountain slopes, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.0 inch

### **Additional Components**

Libeg, very bouldery, and similar soils: 10 percent of the unit

Monaberg and similar soils: 5 percent of the unit

Rock outcrop: 5 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **996D—Libeg-Monaberg gravelly loams, 2 to 15 percent slopes, bouldery**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Libeg and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces

*Slope:* 2 to 15 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly alluvium

Gravelly colluvium

Gravelly slope alluvium

Gravelly till

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.7 inches

#### **Monaberg and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 2 to 8 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy slope alluvium derived from basalt

Fine-loamy slope alluvium derived from fine

grained igneous and metamorphic rocks

Fine-loamy alpine till derived from fine grained igneous and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.6 inches

### **Additional Components**

Sebud and similar soils: 5 percent of the unit

Marcel and similar soils: 4 percent of the unit

Nieman and similar soils: 3 percent of the unit

Tibkey and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **997E—Libeg, stony-Monaberg-Adel complex, 15 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 8,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Libeg and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces

*Slope:* 15 to 35 percent

*Surface layer texture:* Loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly alluvium

Gravelly colluvium

Gravelly slope alluvium

Gravelly till

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.9 inches

### **Monaberg and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 15 to 35 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy slope alluvium derived from basalt

Fine-loamy slope alluvium derived from fine grained igneous and metamorphic rocks

Fine-loamy alpine till derived from fine grained igneous and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.8 inches

### **Adel and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Fans, mountainsides

*Slope:* 15 to 35 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly slope alluvium

Fine-loamy alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 9.5 inches

### **Additional Components**

Adel soils that have slopes of less than 15 percent: 5 percent of the unit

Arrowpeak and similar soils: 5 percent of the unit

Libeg, very bouldery, and similar soils: 5 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **998E—Libeg-Nieman, stony, complex, 8 to 25 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 8,000 feet

*Mean annual precipitation:* 15 to 30 inches

*Frost-free period:* 30 to 70 days

### **Component Description**

#### **Libeg and similar soils**

*Extent:* 55 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces

*Slope:* 8 to 25 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly alluvium

Gravelly colluvium

Gravelly slope alluvium

Gravelly till

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.7 inches

#### **Nieman and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Escarpments, mountain slopes, ridges

*Slope:* 8 to 25 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

### **Additional Components**

Rock outcrop: 5 percent of the unit

Sebud and similar soils: 4 percent of the unit

Arrowpeak and similar soils: 2 percent of the unit

Marcel and similar soils: 2 percent of the unit

Surdal and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **999E—Libeg, very stony-Libeg, very bouldery, complex, 4 to 25 percent slopes**

#### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

#### **Component Description**

##### **Libeg, very stony, and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces

*Slope:* 4 to 25 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly alluvium

Gravelly colluvium

Gravelly slope alluvium

Gravelly till

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.3 inches

##### **Libeg, very bouldery, and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces

*Slope:* 4 to 25 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly alluvium

Gravelly colluvium

Gravelly slope alluvium

Gravelly till

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.3 inches

#### **Additional Components**

Nieman and similar soils: 3 percent of the unit

Sebud and similar soils: 3 percent of the unit

Marcel and similar soils: 2 percent of the unit

Worock and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **999F—Libeg, very stony-Libeg, rubbly, association, 25 to 60 percent slopes**

#### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

#### **Component Description**

##### **Libeg, very stony, and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces

*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly alluvium

Gravelly colluvium

Gravelly slope alluvium

Gravelly till

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.3 inches

##### **Libeg, rubbly, and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces

*Slope:* 25 to 60 percent

*Surface layer texture:* Very stony loam

*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly alluvium

Gravelly colluvium

Gravelly slope alluvium

Gravelly till

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.5 inches

### Additional Components

Nieman and similar soils: 3 percent of the unit  
 Sebud and similar soils: 3 percent of the unit  
 Marcel and similar soils: 2 percent of the unit  
 Rock outcrop: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1003E—Tiban, bouldery-Cheadle, very bouldery, complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Tiban and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from basalt  
     Gravelly colluvium derived from metavolcanics  
     Gravelly slope alluvium derived from basalt  
     Gravelly slope alluvium derived from metavolcanics  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 6.0 inches

#### Cheadle and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, mountain slopes, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

    Gravelly residuum derived from basalt

    Gravelly residuum derived from sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.4 inches

### Additional Components

Ratiopeak and similar soils: 6 percent of the unit  
 Kimpton and similar soils: 4 percent of the unit  
 Surdal and similar soils: 4 percent of the unit  
 Tibkey and similar soils: 4 percent of the unit  
 Rock outcrop: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1004E—Tiban, rubbly-Tiban, very bouldery-Rock outcrop complex, 15 to 45 percent slopes

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Tiban, rubbly, and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Extremely stony loam  
*Percent of surface covered by rock fragments:* 15 to 50 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from basalt  
     Gravelly colluvium derived from metavolcanics  
     Gravelly slope alluvium derived from basalt  
     Gravelly slope alluvium derived from metavolcanics  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.3 inches

#### Tiban, very bouldery, and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.7 inches

### **Rock outcrop**

*Extent:* 10 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

### **Additional Components**

Nieman and similar soils: 6 percent of the unit  
 Rubble land: 5 percent of the unit  
 Helmville and similar soils: 5 percent of the unit  
 Libeg and similar soils: 4 percent of the unit  
 Ratiopeak and similar soils: 3 percent of the unit  
 Cheadle and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1101E—Monaberg, stony-Libeg, bouldery, complex, 15 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Monaberg and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy slope alluvium derived from basalt  
 Fine-loamy slope alluvium derived from fine grained igneous and metamorphic rocks  
 Fine-loamy alpine till derived from fine grained igneous and metamorphic rocks  
*Flooding:* None  
*Available water capacity:* Mainly 8.8 inches

### **Libeg and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (bouldery)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly alluvium  
 Gravelly colluvium  
 Gravelly slope alluvium  
 Gravelly till  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 4.9 inches

### **Additional Components**

Branham and similar soils: 5 percent of the unit  
 Lowder and similar soils: 5 percent of the unit  
 Redfern and similar soils: 5 percent of the unit  
 Tigeron and similar soils: 5 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1102B—Adel-Libeg, stony, complex, 1 to 4 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Adel and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Fans, mountainsides

*Slope:* 1 to 4 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly slope alluvium

Fine-loamy alluvium

*Native plant cover type:* Rangeland

*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 7.9 inches

### **Libeg and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces

*Slope:* 1 to 4 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly alluvium

Gravelly colluvium

Gravelly slope alluvium

Gravelly till

*Native plant cover type:* Rangeland

*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 4.7 inches

### **Additional Components**

Tibkey and similar soils: 6 percent of the unit

Monaberg and similar soils: 5 percent of the unit

Tineman and similar soils: 5 percent of the unit

Sebud and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1103D—Adel-Libeg complex, 4 to 15 percent slopes, stony**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

## **Component Description**

### **Adel and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Fans, mountainsides

*Slope:* 4 to 15 percent

*Surface layer texture:* Loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly slope alluvium

Fine-loamy alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 7.9 inches

### **Libeg and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces

*Slope:* 4 to 15 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly alluvium

Gravelly colluvium

Gravelly slope alluvium

Gravelly till

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.7 inches

### **Additional Components**

Monaberg and similar soils: 10 percent of the unit

Tiban and similar soils: 6 percent of the unit

Sebud and similar soils: 5 percent of the unit

Cheadle and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1104C—Adel loam, 2 to 8 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 8,000 feet

*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Adel loam and similar soils

*Extent:* 80 percent of the map unit  
*Geomorphic position:* Fans, mountainsides  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly slope alluvium  
     Fine-loamy alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.5 inches

### Additional Components

Adel soils that have slopes of more than 8 percent: 10 percent of the unit  
 Libeg and similar soils: 5 percent of the unit  
 Monaberg and similar soils: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1120E—Quaint channery loam, 8 to 35 percent slopes, very stony

### Map Unit Setting

*Landscape:* Uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Quaint and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Hillsides, plateaus, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Channery loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:* Calcareous, gravelly slope alluvium over residuum derived from hard, red shale

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.6 inches

### Additional Components

Redfist and similar soils: 4 percent of the unit  
 Quincreek and similar soils: 3 percent of the unit  
 Rock outcrop: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1121E—Quaint-Rock outcrop-Redfist complex, 4 to 25 percent slopes

### Map Unit Setting

*Landscape:* Uplands, foothills  
*Elevation:* 4,000 to 6,500 feet  
*Mean annual precipitation:* 12 to 19 inches  
*Frost-free period:* 80 to 105 days

### Component Description

#### Quaint and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Hillsides, plateaus, ridges  
*Slope:* 4 to 25 percent  
*Surface layer texture:* Channery loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:* Calcareous, gravelly slope alluvium over residuum derived from hard, red shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.6 inches

#### Rock outcrop

*Extent:* 25 percent of the map unit  
*Definition:* This component consists mainly of areas of exposed hard, fractured shale bedrock. Flagstones litter the areas and accumulate at the base of hills and escarpments.

#### Redfist and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Channery loam

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

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly colluvium over residuum derived from hard, red shale

Calcareous, gravelly residuum derived from hard, red shale

Calcareous, gravelly slope alluvium over residuum derived from hard, red shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

### Additional Components

Quincreek and similar soils: 5 percent of the unit

Ferball and similar soils: 4 percent of the unit

Devilfence and similar soils: 3 percent of the unit

Wilspring and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1121F—Quaint-Rock outcrop complex, 15 to 45 percent slopes

### Map Unit Setting

*Landscape:* Uplands, foothills

*Elevation:* 4,400 to 6,500 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Quaint and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Hillsides, plateaus, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Channery loam

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

*Drainage class:* Somewhat excessively drained

*Parent material:* Calcareous, gravelly slope alluvium over residuum derived from hard, red shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.6 inches

#### Rock outcrop

*Extent:* 40 percent of the map unit

*Definition:* This component consists mainly of areas of exposed hard, fractured shale bedrock.

Flagstones litter the areas and accumulate at the base of hills and escarpments.

### Additional Components

Redfist and similar soils: 8 percent of the unit

Quincreek and similar soils: 6 percent of the unit

Devilfence and similar soils: 3 percent of the unit

Wilspring and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1122D—Quaint-Redfist channery loams, 4 to 15 percent slopes

### Map Unit Setting

*Landscape:* Uplands

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 12 to 19 inches

*Frost-free period:* 80 to 105 days

### Component Description

#### Quaint and similar soils

*Extent:* 55 percent of the map unit

*Geomorphic position:* Hillsides, plateaus, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Channery loam

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

*Drainage class:* Somewhat excessively drained

*Parent material:* Calcareous, gravelly slope alluvium over residuum derived from hard, red shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.6 inches

#### Redfist and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls

*Slope:* 4 to 15 percent

*Surface layer texture:* Channery loam

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

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly colluvium over residuum  
derived from hard, red shale

Calcareous, gravelly residuum derived from hard,  
red shale

Calcareous, gravelly slope alluvium over residuum  
derived from hard, red shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

**Additional Components**

Quincreek and similar soils: 4 percent of the unit

Ferball and similar soils: 2 percent of the unit

Quaint, very stony, and similar soils: 2 percent of the  
unit

Rock outcrop: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1131C—Redfist-Quaint channery loams, 2 to 8 percent slopes****Map Unit Setting**

*Landscape:* Uplands, foothills

*Elevation:* 4,400 to 6,500 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

**Component Description****Redfist and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls

*Slope:* 2 to 8 percent

*Surface layer texture:* Channery loam

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

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly colluvium over residuum  
derived from hard, red shale

Calcareous, gravelly residuum derived from hard,  
red shale

Calcareous, gravelly slope alluvium over residuum  
derived from hard, red shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

**Quaint and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Hillsides, plateaus, ridges

*Slope:* 2 to 8 percent

*Surface layer texture:* Channery loam

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

*Drainage class:* Somewhat excessively drained

*Parent material:* Calcareous, gravelly slope alluvium  
over residuum derived from hard, red shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.6 inches

**Additional Components**

Quincreek and similar soils: 5 percent of the unit

Martinsdale and similar soils: 4 percent of the unit

Devilfence and similar soils: 3 percent of the unit

Wilspring and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1131D—Redfist-Quaint channery loams, 8 to 15 percent slopes****Map Unit Setting**

*Landscape:* Uplands, foothills

*Elevation:* 4,400 to 6,500 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

**Component Description****Redfist and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls

*Slope:* 8 to 15 percent

*Surface layer texture:* Channery loam

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

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly colluvium over residuum  
derived from hard, red shale

Calcareous, gravelly residuum derived from hard,  
red shale

Calcareous, gravelly slope alluvium over residuum  
derived from hard, red shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

#### **Quaint and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Hillsides, plateaus, ridges

*Slope:* 8 to 15 percent

*Surface layer texture:* Channery loam

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

*Drainage class:* Somewhat excessively drained

*Parent material:* Calcareous, gravelly slope alluvium over residuum derived from hard, red shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.6 inches

#### **Additional Components**

Quincreek and similar soils: 6 percent of the unit

Devilfence and similar soils: 4 percent of the unit

Wilspring and similar soils: 4 percent of the unit

Martinsdale and similar soils: 3 percent of the unit

Rock outcrop: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1132D—Redfist, bouldery-Perma, bouldery-Rock outcrop complex, 2 to 35 percent slopes**

#### **Map Unit Setting**

*Landscape:* Uplands, foothills

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Redfist and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls

*Slope:* 2 to 35 percent

*Surface layer texture:* Channery loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly colluvium over residuum derived from hard, red shale

Calcareous, gravelly residuum derived from hard, red shale

Calcareous, gravelly slope alluvium over residuum derived from hard, red shale

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

#### **Perma and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges

*Slope:* 2 to 35 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.5 inches

#### **Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard sedimentary and metamorphic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

#### **Additional Components**

Whitlash and similar soils: 7 percent of the unit

Windham and similar soils: 6 percent of the unit

Quaint and similar soils: 4 percent of the unit

Perma, very bouldery, and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1141D—Devilfence very channery loam, 4 to 15 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands

*Special feature:* Delineations of this map unit in the Black Butte quad area generally do not have lime.

*Elevation:* 4,400 to 6,500 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Devilfence and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Very channery loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:* Gravelly residuum derived from shale-siltstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

### Additional Components

Rock outcrop: 3 percent of the unit  
 Vigilante and similar soils: 3 percent of the unit  
 Wilspring and similar soils: 2 percent of the unit  
 Quincreek and similar soils: 1 percent of the unit  
 Redfist and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1142E—Devilfence-Rock outcrop-Wilspring complex, 8 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,500 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Devilfence and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Very channery loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:* Gravelly residuum derived from shale-siltstone  
*Native plant cover type:* Rangeland

*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

#### Rock outcrop

*Extent:* 25 percent of the map unit  
*Definition:* This component consists mainly of areas of exposed hard, fractured shale bedrock. Flagstones litter the areas and accumulate at the base of hills and escarpments.

#### Wilspring and similar soils

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Channery loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*

Calcareous, gravelly colluvium over residuum derived from claystone  
 Calcareous, gravelly colluvium over residuum derived from shale  
 Calcareous, gravelly residuum derived from shale  
 Calcareous, gravelly slope alluvium over residuum derived from claystone  
 Calcareous, gravelly slope alluvium over residuum derived from shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

### Additional Components

Vigilante and similar soils: 6 percent of the unit  
 Quincreek and similar soils: 5 percent of the unit  
 Wimper and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1142F—Devilfence-Rock outcrop complex, 35 to 60 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Special feature:* Delineations of this map unit in the Black Butte quad area generally do not have lime.  
*Elevation:* 4,400 to 6,500 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Devilence and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very channery loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:* Gravelly residuum derived from shale-siltstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

#### Rock outcrop

*Extent:* 35 percent of the map unit  
*Definition:* This component consists mainly of areas of exposed hard, fractured shale bedrock. Flagstones litter the areas and accumulate at the base of hills and escarpments.

### Additional Components

Quincreek and similar soils: 6 percent of the unit  
 Wilspring and similar soils: 6 percent of the unit  
 Vigilante and similar soils: 5 percent of the unit  
 Redfist and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 1143F—Deville-Wilde-Rock outcrop complex, 25 to 60 percent slopes

#### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,500 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Deville and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Very channery loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained

*Parent material:* Gravelly residuum derived from shale-siltstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

#### Wilde and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 25 to 45 percent  
*Surface layer texture:* Very channery loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*

Gravelly colluvium over residuum derived from claystone

Gravelly colluvium over residuum derived from shale

Gravelly residuum derived from shale

Gravelly slope alluvium over residuum derived from claystone

Gravelly slope alluvium over residuum derived from shale

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.0 inches

#### Rock outcrop

*Extent:* 15 percent of the map unit  
*Definition:* This component consists mainly of areas of exposed hard, fractured shale bedrock. Flagstones litter the areas and accumulate at the base of hills and escarpments.

### Additional Components

Vigilante and similar soils: 4 percent of the unit  
 Devilence and similar soils: 3 percent of the unit  
 Redfist and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 1146E—Deville-Rock outcrop-Wilde complex, 8 to 35 percent slopes

#### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,500 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Deville and similar soils

*Extent:* 45 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Very channery loam

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

*Drainage class:* Somewhat excessively drained

*Parent material:* Gravelly residuum derived from shale-siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

#### Rock outcrop

*Extent:* 35 percent of the map unit

*Definition:* This component consists mainly of areas of exposed hard, fractured shale bedrock.

Flagstones litter the areas and accumulate at the base of hills and escarpments.

#### Wilde and similar soils

*Extent:* 15 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Channery loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from claystone

Gravelly colluvium over residuum derived from shale

Gravelly residuum derived from shale

Gravelly slope alluvium over residuum derived from claystone

Gravelly slope alluvium over residuum derived from shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.1 inches

### Additional Components

Vigilante and similar soils: 3 percent of the unit

Wimper and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 1152D—Wilspring-Devilfence complex, 4 to 15 percent slopes

#### Map Unit Setting

*Landscape:* Foothills, uplands

*Special feature:* Delineations of this map unit in the Black Butte quad area generally do not have lime.

*Elevation:* 4,400 to 6,500 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Wilspring and similar soils

*Extent:* 55 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Channery loam

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

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly colluvium over residuum derived from claystone

Calcareous, gravelly colluvium over residuum derived from shale

Calcareous, gravelly residuum derived from shale

Calcareous, gravelly slope alluvium over residuum derived from claystone

Calcareous, gravelly slope alluvium over residuum derived from shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

#### Devilfence and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Very channery loam

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

*Drainage class:* Somewhat excessively drained

*Parent material:* Gravelly residuum derived from shale-siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

### Additional Components

Quincreek and similar soils: 7 percent of the unit

Rock outcrop: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1152E—Wilspring-Devilfence-Rock outcrop complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,500 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Wilspring and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Channery loam

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

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly colluvium over residuum derived from claystone

Calcareous, gravelly colluvium over residuum derived from shale

Calcareous, gravelly residuum derived from shale

Calcareous, gravelly slope alluvium over residuum derived from claystone

Calcareous, gravelly slope alluvium over residuum derived from shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

#### Devilfence and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Very channery loam

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

*Drainage class:* Somewhat excessively drained

*Parent material:* Gravelly residuum derived from shale-siltstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

### Rock outcrop

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of areas of exposed hard, fractured shale bedrock.

Flagstones litter the areas and accumulate at the base of hills and escarpments.

### Additional Components

Quincreek and similar soils: 5 percent of the unit

Vigilante and similar soils: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1153C—Wilspring-Quincreek-Devilfence complex, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,500 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Wilspring and similar soils

*Extent:* 45 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 2 to 8 percent

*Surface layer texture:* Channery loam

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

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly colluvium over residuum derived from claystone

Calcareous, gravelly colluvium over residuum derived from shale

Calcareous, gravelly residuum derived from shale

Calcareous, gravelly slope alluvium over residuum derived from claystone

Calcareous, gravelly slope alluvium over residuum derived from shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

#### Quincreek and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, knolls

*Slope:* 2 to 8 percent  
*Surface layer texture:* Loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, gravelly residuum derived from hard, red shale  
     Calcareous, gravelly slope alluvium over residuum derived from hard, red shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.9 inches

#### **Devilence and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Very channery loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:* Gravelly residuum derived from shale-siltstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

#### **Additional Components**

Rock outcrop: 4 percent of the unit  
 Vigilante and similar soils: 3 percent of the unit  
 Wimper and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1154E—Wilde-Deville-Vigilante complex, 8 to 35 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills  
*Elevation:* 4,400 to 6,500 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Wilde and similar soils**

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Very channery loam

*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium over residuum derived from claystone  
     Gravelly colluvium over residuum derived from shale  
     Gravelly residuum derived from shale  
     Gravelly slope alluvium over residuum derived from claystone  
     Gravelly slope alluvium over residuum derived from shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.0 inches

##### **Deville and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Very channery loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:* Gravelly residuum derived from shale-siltstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.3 inches

##### **Vigilante and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, interfluves, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Channery loam  
*Depth to restrictive feature:* 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from shale over residuum derived from shale  
     Gravelly slope alluvium derived from claystone over residuum derived from claystone  
     Gravelly slope alluvium derived from shale over residuum derived from shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.9 inches

#### **Additional Components**

Rock outcrop: 4 percent of the unit of the unit

Wilde soils that have slopes of more than 35 percent:  
3 percent of the unit  
Wilspring and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1154F—Wilde, stony-Vigilante-Deville, very stony, complex, 35 to 70 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,500 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Wilde and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Very channery loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly colluvium over residuum derived from claystone  
Gravelly colluvium over residuum derived from shale  
Gravelly residuum derived from shale  
Gravelly slope alluvium over residuum derived from claystone  
Gravelly slope alluvium over residuum derived from shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.0 inches

#### Vigilante and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, interfluvies, ridges  
*Slope:* 35 to 50 percent  
*Surface layer texture:* Channery loam  
*Depth to restrictive feature:* 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from shale over residuum derived from shale  
Gravelly slope alluvium derived from claystone over residuum derived from claystone  
Gravelly slope alluvium derived from shale over residuum derived from shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.9 inches

#### Deville and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Very channery loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:* Gravelly residuum derived from shale-siltstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.3 inches

### Additional Components

Wilde soils that are not stony: 6 percent of the unit  
Perma and similar soils: 5 percent of the unit  
Rock outcrop: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1161E—Yreka, bouldery-Hoyt, bouldery-Shaboom, very bouldery, complex, 15 to 45 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

### Component Description

#### Yreka and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, mountain slopes, ridges

*Slope:* 15 to 45 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Gravelly colluvium derived from mixed, fine grained igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 7.1 inches

#### **Hoyt and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium derived from basalt  
 Fine-loamy slope alluvium derived from basalt  
 Fine-loamy till  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 9.1 inches

#### **Shaboom and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from granite  
 Gravelly slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

#### **Additional Components**

Skyview and similar soils: 5 percent of the unit  
 Elmark and similar soils: 3 percent of the unit  
 Rock outcrop: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1162E—Yreka very cobbly loam, 15 to 35 percent slopes, bouldery**

#### **Map Unit Setting**

*Landscape:* Foothills, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

#### **Component Description**

##### **Yreka and similar soils**

*Extent:* 95 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, mountain slopes, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Gravelly colluvium derived from mixed, fine grained igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 7.0 inches

#### **Additional Components**

Skyview and similar soils: 5 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1163F—Ymark, very bouldery-Elmark, very bouldery-Rock outcrop complex, 25 to 60 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

## Component Description

### Ymark and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, mountain slopes, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Very cobbly sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly colluvium derived from granite and fine grained igneous rock over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.6 inches

### Elmark and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, mountainsides, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Gravelly coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium over sandy and gravelly residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium over sandy and gravelly residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.5 inches

### Rock outcrop

*Extent:* 15 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

## Additional Components

Kellygulch and similar soils: 5 percent of the unit  
 Shaboom and similar soils: 5 percent of the unit

## Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1164F—Yreka-Brickner, stony, complex, 35 to 70 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

## Component Description

### Yreka and similar soils

*Extent:* 65 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, mountain slopes, ridges  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Gravelly coarse sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Gravelly colluvium derived from mixed, fine grained igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 6.9 inches

### Brickner and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Very gravelly loamy coarse sand  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from sandstone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 0.9 inch

## Additional Components

Sawbuck and similar soils: 7 percent of the unit  
 Skyview and similar soils: 5 percent of the unit  
 Rock outcrop: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1170E—Whitlash-Whitlash, stony-Rock outcrop complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Uplands, foothills

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

### Component Description

#### Whitlash and similar soils

*Extent:* 45 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Very cobbly loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

#### Whitlash, stony, and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

### Rock outcrop

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard sedimentary and metamorphic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

### Additional Components

Sawicki and similar soils: 5 percent of the unit

Blaincreek and similar soils: 4 percent of the unit

Kadygulch and similar soils: 3 percent of the unit

Perma and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1171F—Castner, bouldery-Rock outcrop complex, 25 to 50 percent slopes

### Map Unit Setting

*Landscape:* Uplands, foothills, valleys

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 12 to 19 inches

*Frost-free period:* 80 to 105 days

### Component Description

#### Castner and similar soils

*Extent:* 50 percent of the map unit

*Geomorphic position:* Hills, hillsides, ridges

*Slope:* 25 to 50 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

### Rock outcrop

*Extent:* 35 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard sedimentary and metamorphic

bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

### Additional Components

Wickes and similar soils: 5 percent of the unit  
Perma and similar soils: 4 percent of the unit  
Sieben and similar soils: 3 percent of the unit  
Yetull and similar soils: 2 percent of the unit  
Whitlash and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1172F—Castner, very bouldery-Rock outcrop complex, 35 to 60 percent slopes

### Map Unit Setting

*Landscape:* Uplands, foothills, valleys  
*Elevation:* 4,000 to 6,000 feet  
*Mean annual precipitation:* 12 to 19 inches  
*Frost-free period:* 80 to 105 days

### Component Description

#### Castner and similar soils

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Hills, hillsides, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Stony loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly residuum derived from basalt  
Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

#### Rock outcrop

*Extent:* 20 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard sedimentary and metamorphic bedrock. Angular cobbles, stones, and boulders

litter the areas and accumulate at the base of hills and escarpments.

### Additional Components

Tolbert and similar soils: 6 percent of the unit  
Wickes and similar soils: 5 percent of the unit  
Sieben and similar soils: 4 percent of the unit  
Whitlash and similar soils: 3 percent of the unit  
Yetull and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1180E—Farnuf loam, 15 to 35 percent slopes, stony

### Map Unit Setting

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,500 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Farnuf and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
Fine-loamy alluvium derived from granite  
Fine-loamy alluvium derived from sandstone-shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.7 inches

### Additional Components

Quaint and similar soils: 3 percent of the unit  
Wilspring and similar soils: 3 percent of the unit  
Placerton and similar soils: 2 percent of the unit  
Rock outcrop: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1182C—Breeton gravelly loam, 2 to 8 percent slopes****Map Unit Setting**

*Landscape:* Foothills, mountains, river valleys, valleys, uplands

*Elevation:* 3,940 to 6,000 feet

*Mean annual precipitation:* 12 to 19 inches

*Frost-free period:* 80 to 105 days

**Component Description****Breeton and similar soils**

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 2 to 8 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy alluvium derived from granite

Coarse-loamy colluvium derived from granite

Coarse-loamy slope alluvium derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.9 inches

**Additional Components**

Breeton soils that have slopes of more than 8 percent: 5 percent of the unit

Baxton and similar soils: 3 percent of the unit

Faith and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1191E—Silverchief very cobbly clay loam, 8 to 35 percent slopes, bouldery****Map Unit Setting**

*Landscape:* Foothills, mountains, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

**Component Description****Silverchief and similar soils**

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, mountain slopes

*Slope:* 8 to 35 percent

*Surface layer texture:* Very cobbly clay loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Clayey slope alluvium derived from mixed igneous, sedimentary, and metamorphic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 6.4 inches

**Additional Components**

Sawbuck and similar soils: 8 percent of the unit

Martinsdale and similar soils: 7 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1210C—Ferball clay loam, 2 to 8 percent slopes****Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 6,000 feet

*Mean annual precipitation:* 10 to 17 inches

*Frost-free period:* 80 to 115 days

**Component Description****Ferball and similar soils**

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides

*Slope:* 2 to 8 percent

*Surface layer texture:* Clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Fine-loamy alluvium derived from red shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 10.7 inches

**Additional Components**

Varney and similar soils: 4 percent of the unit

Quaint and similar soils: 3 percent of the unit

Redfist and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1222C—Martinsdale-Martinsdale, stony-Shawmut complex, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Martinsdale and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Cobbly sandy clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Calcareous, fine-loamy alluvium derived from granite

Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.1 inches

#### Martinsdale, stony, and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Sandy clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Calcareous, fine-loamy alluvium derived from granite

Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.2 inches

#### Shawmut and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides  
*Slope:* 2 to 8 percent

*Surface layer texture:* Cobbly sandy clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.1 inches

### Additional Components

Hilger and similar soils: 4 percent of the unit

Farnuf and similar soils: 3 percent of the unit

Judell and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1222E—Martinsdale-Martinsdale, stony-Shawmut complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Martinsdale and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Cobbly sandy clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Calcareous, fine-loamy alluvium derived from granite

Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.1 inches

#### Martinsdale, stony, and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 15 to 35 percent  
*Surface layer texture:* Sandy clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, fine-loamy alluvium derived from granite  
     Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.2 inches

#### **Shawmut and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Cobbly sandy clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from basalt  
     Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.1 inches

#### **Additional Components**

Hilger and similar soils: 4 percent of the unit  
 Farnuf and similar soils: 3 percent of the unit  
 Windham and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1223D—Martinsdale-Shawmut complex, 2 to 15 percent slopes, bouldery**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Martinsdale and similar soils**

*Extent:* 65 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Sandy clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, fine-loamy alluvium derived from granite  
     Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.2 inches

#### **Shawmut and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from basalt  
     Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.4 inches

#### **Additional Components**

Shawmut, cobbly, and similar soils: 4 percent of the unit  
 Farnuf and similar soils: 3 percent of the unit  
 Hilger and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1242D—Baxton-Connieo, very bouldery-Rock outcrop complex, 4 to 15 percent slopes, moist**

#### **Map Unit Setting**

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Baxton and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Hillsides, mountainsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
 Coarse-loamy residuum derived from granite  
 Coarse-loamy slope alluvium derived from granite over residuum derived from granite  
 Sandy colluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.1 inches

#### Connieo and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.9 inches

#### Rock outcrop

*Extent:* 10 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Clancy and similar soils: 5 percent of the unit  
 Burtoner and similar soils: 4 percent of the unit  
 Breton and similar soils: 3 percent of the unit  
 Elmark and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 1242E—Baxton-Connieo, very bouldery-Rock outcrop complex, 15 to 35 percent slopes, moist

#### Map Unit Setting

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Baxton and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Hillsides, mountainsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Coarse sandy loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
 Coarse-loamy residuum derived from granite  
 Coarse-loamy slope alluvium derived from granite over residuum derived from granite  
 Sandy colluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.1 inches

#### Connieo and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.9 inches

#### Rock outcrop

*Extent:* 10 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Catgulch and similar soils: 5 percent of the unit  
Elmark and similar soils: 4 percent of the unit  
Breeton and similar soils: 3 percent of the unit  
Burtoner and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1243D—Baxton-Connieo coarse sandy loams, 4 to 15 percent slopes, bouldery

### Map Unit Setting

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Baxton and similar soils

*Extent:* 55 percent of the map unit  
*Geomorphic position:* Hillsides, mountainsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
Coarse-loamy residuum derived from granite  
Coarse-loamy slope alluvium derived from granite over residuum derived from granite  
Sandy colluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.1 inches

#### Connieo and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

### Additional Components

Baxton soils that have slopes of more than 15 percent: 6 percent of the unit

Breeton and similar soils: 4 percent of the unit

Rock outcrop: 3 percent of the unit

Ashbray and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1244D—Baxton-Connieo, very bouldery-Rock outcrop complex, 4 to 15 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Baxton and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Hillsides, mountainsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Sandy loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
Coarse-loamy residuum derived from granite  
Coarse-loamy slope alluvium derived from granite over residuum derived from granite  
Sandy colluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.1 inches

#### Connieo and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.9 inches

### **Rock outcrop**

*Extent:* 15 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### **Additional Components**

Breton and similar soils: 3 percent of the unit  
 Catgulch and similar soils: 3 percent of the unit  
 Ashbray and similar soils: 2 percent of the unit  
 Burtoner and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1244E—Baxton-Connieo-Rock outcrop complex, 15 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Baxton and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Hillsides, mountainsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Sandy loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
 Coarse-loamy residuum derived from granite  
 Coarse-loamy slope alluvium derived from granite over residuum derived from granite  
 Sandy colluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.1 inches

### **Connieo and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Coarse sandy loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.9 inches

### **Rock outcrop**

*Extent:* 20 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### **Additional Components**

Breton and similar soils: 3 percent of the unit  
 Catgulch and similar soils: 3 percent of the unit  
 Ashbray and similar soils: 2 percent of the unit  
 Burtoner and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1245E—Baxton-Breton-Connieo complex, 15 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

### **Component Description**

#### **Baxton and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Hillsides, mountainsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Sandy loam

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Somewhat excessively drained

*Parent material:*

Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium derived from granite over residuum derived from granite

Sandy colluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

### **Breton and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 15 to 35 percent

*Surface layer texture:* Coarse sandy loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy alluvium derived from granite

Coarse-loamy colluvium derived from granite

Coarse-loamy slope alluvium derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.4 inches

### **Connieo and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Coarse sandy loam

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

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

### **Additional Components**

Baxton soils that have slopes of less than 15 percent:  
5 percent of the unit

Breton soils that have slopes of less than 15 percent:  
3 percent of the unit

Rock outcrop: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1246E—Baxton, stony-Breton, bouldery-Catgulch, very stony, complex, 15 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, mountains, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

### **Component Description**

#### **Baxton and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Hillsides, mountainsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Somewhat excessively drained

*Parent material:*

Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium derived from granite over residuum derived from granite

Sandy colluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

#### **Breton and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 15 to 35 percent

*Surface layer texture:* Sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy alluvium derived from granite

Coarse-loamy colluvium derived from granite

Coarse-loamy slope alluvium derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.8 inches

#### **Catgulch and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs

*Slope:* 15 to 35 percent

*Surface layer texture:* Cobbly sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

### **Additional Components**

Baxton soils that have slopes of less than 15 percent: 5 percent of the unit

Breton soils that have slopes of less than 15 percent: 5 percent of the unit

Bielenberg and similar soils: 3 percent of the unit

Rock outcrop: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1247E—Baxton-Kellygulch-Connieo complex, 15 to 45 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, mountains, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

### **Component Description**

#### **Baxton and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Hillsides, mountainsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Sandy loam

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Somewhat excessively drained

*Parent material:*

Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium derived from granite over residuum derived from granite

Sandy colluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

#### **Kellygulch and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Sandy loam

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

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy colluvium over residuum derived from granite

Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

#### **Connieo and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

### **Additional Components**

Baxton soils that have slopes of less than 15 percent: 3 percent of the unit

Breton and similar soils: 3 percent of the unit

Rock outcrop: 3 percent of the unit

Shaboom and similar soils: 3 percent of the unit

Skyview and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1250C—Work cobbly clay loam, 2 to 8 percent slopes, stony****Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,500 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

**Component Description****Work and similar soils**

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Cobbly clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Calcareous, clayey alluvium derived from mixed igneous, sedimentary, and metamorphic rocks

Calcareous, gravelly outwash till

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.1 inches

**Additional Components**

Martinsdale and similar soils: 4 percent of the unit  
 Quaint and similar soils: 3 percent of the unit  
 Wilspring and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1250E—Work very cobbly clay loam, 8 to 25 percent slopes****Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

**Component Description****Work and similar soils**

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 8 to 25 percent

*Surface layer texture:* Very cobbly clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, clayey alluvium derived from mixed igneous, sedimentary, and metamorphic rocks

Calcareous, gravelly outwash till

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.1 inches

**Additional Components**

Martinsdale and similar soils: 6 percent of the unit  
 Perma and similar soils: 5 percent of the unit  
 Windham and similar soils: 4 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1271D—Placerton-Farnuf-Connieo complex, 8 to 15 percent slopes****Map Unit Setting**

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 12 to 19 inches  
*Frost-free period:* 80 to 95 days

**Component Description****Placerton and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Divides, hillsides, mountain slopes, ridges  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium over residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.1 inches

**Farnuf and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy alluvium derived from granite  
 Fine-loamy alluvium derived from sandstone-shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.4 inches

**Connieo and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.1 inches

**Additional Components**

Jeffcity and similar soils: 5 percent of the unit  
 Cedric and similar soils: 4 percent of the unit  
 Kounter and similar soils: 3 percent of the unit  
 Rock outcrop: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1272D—Placerton-Connieo-Jeffcity complex, 4 to 15 percent slopes****Map Unit Setting**

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 12 to 19 inches  
*Frost-free period:* 80 to 95 days

**Component Description****Placerton and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Divides, hillsides, mountain slopes, ridges

*Slope:* 4 to 15 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium over residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.1 inches

**Connieo and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.1 inches

**Jeffcity and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.8 inches

**Additional Components**

Ashbray and similar soils: 2 percent of the unit  
 Cedric and similar soils: 2 percent of the unit  
 Farnuf and similar soils: 2 percent of the unit  
 Kounter and similar soils: 2 percent of the unit  
 Rock outcrop: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1273E—Placerton-Farnuf-Breton complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 12 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Placerton and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Divides, hillsides, mountain slopes, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Sandy loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium over residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.0 inches

#### Farnuf and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy alluvium derived from granite  
 Fine-loamy alluvium derived from sandstone-shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.7 inches

#### Breton and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Coarse sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained

#### Parent material:

Coarse-loamy alluvium derived from granite  
 Coarse-loamy colluvium derived from granite  
 Coarse-loamy slope alluvium derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.4 inches

### Additional Components

Cedric and similar soils: 4 percent of the unit  
 Jeffcity and similar soils: 4 percent of the unit  
 Rock outcrop: 4 percent of the unit  
 Ashbray and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1275D—Placerton-Farnuf-Connieo gravelly sandy clay loams, 8 to 15 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

### Component Description

#### Placerton and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Divides, hillsides, mountain slopes, ridges  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium over residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.1 inches

#### Farnuf and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 8 to 15 percent

*Surface layer texture:* Gravelly sandy clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy alluvium derived from granite

Fine-loamy alluvium derived from sandstone-shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 9.4 inches

### **Connieo and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 8 to 15 percent

*Surface layer texture:* Gravelly sandy clay loam

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

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.1 inches

### **Additional Components**

Placerton soils that have slopes of more than 15 percent: 6 percent of the unit

Jeffcity and similar soils: 5 percent of the unit

Rock outcrop: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1275E—Placerton-Farnuf-Connieo complex, 15 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, mountains, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

### **Component Description**

#### **Placerton and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Divides, hillsides, mountain slopes, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Sandy clay loam

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium over residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.3 inches

### **Farnuf and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 15 to 35 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy alluvium derived from granite

Fine-loamy alluvium derived from sandstone-shale

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 9.7 inches

### **Connieo and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Gravelly sandy clay loam

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

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.1 inches

### **Additional Components**

Farnuf soils that have slopes of less than 15 percent: 6 percent of the unit

Rock outcrop: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1276D—Placerton-Connieo-Jeffcity complex, 4 to 15 percent slopes, warm

### Map Unit Setting

*Landscape:* Foothills, mountains, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

### Component Description

#### Placerton and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Divides, hillsides, mountain slopes, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Gravelly sandy clay loam

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium over residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.1 inches

#### Connieo and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Gravelly sandy clay loam

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

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.1 inches

#### Jeffcity and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Loam

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.8 inches

### Additional Components

Placerton soils that have slopes of more than 15 percent: 5 percent of the unit

Farnuf and similar soils: 3 percent of the unit

Rock outcrop: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1277C—Placerton-Jeffcity complex, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 12 to 19 inches

*Frost-free period:* 80 to 105 days

### Component Description

#### Placerton and similar soils

*Extent:* 45 percent of the map unit

*Geomorphic position:* Divides, hillsides, mountain slopes, ridges

*Slope:* 2 to 8 percent

*Surface layer texture:* Sandy loam

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium over residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.0 inches

#### Jeffcity and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.8 inches

### Additional Components

Cedric and similar soils: 6 percent of the unit  
 Farnuf and similar soils: 4 percent of the unit  
 Kounter and similar soils: 4 percent of the unit  
 Ashbray and similar soils: 3 percent of the unit  
 Rock outcrop: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1280D—Crackerville-Catgulch complex, 2 to 15 percent slopes, bouldery

### Map Unit Setting

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Crackerville and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from granite over sandy and gravelly residuum derived from granite  
 Gravelly residuum derived from granite  
 Gravelly slope alluvium derived from granite over sandy and gravelly residuum derived from granite

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.3 inches

#### Catgulch and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.0 inch

### Additional Components

Burtoner and similar soils: 5 percent of the unit  
 Rock outcrop: 5 percent of the unit  
 Ashbray and similar soils: 4 percent of the unit  
 Baxton and similar soils: 3 percent of the unit  
 Breeton and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1281D—Crackerville-Catgulch, bouldery-Rock outcrop complex, 8 to 25 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Crackerville and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 8 to 25 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from granite over sandy and gravelly residuum derived from granite

Gravelly residuum derived from granite

Gravelly slope alluvium derived from granite over sandy and gravelly residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.3 inches

**Catgulch and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs

*Slope:* 8 to 25 percent

*Surface layer texture:* Gravelly sandy clay loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.1 inches

**Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

**Additional Components**

Ashbray and similar soils: 5 percent of the unit

Burtoner and similar soils: 5 percent of the unit

Kellygulch and similar soils: 4 percent of the unit

Baxton and similar soils: 3 percent of the unit

Breeton and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1282D—Crackerville-Bielenberg-Catgulch, bouldery, complex, 8 to 20 percent slopes****Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

**Component Description****Crackerville and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 8 to 15 percent

*Surface layer texture:* Gravelly sandy clay loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from granite over sandy and gravelly residuum derived from granite

Gravelly residuum derived from granite

Gravelly slope alluvium derived from granite over sandy and gravelly residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.3 inches

**Bielenberg and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Hillsides, ridges

*Slope:* 8 to 15 percent

*Surface layer texture:* Gravelly loam

*Depth to restrictive feature:* 40 to 50 inches to bedrock (paralithic); 50 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from granite over residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.4 inches

**Catgulch and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs

*Slope:* 8 to 20 percent

*Surface layer texture:* Gravelly sandy clay loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from granite

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.1 inches

### **Additional Components**

Burtoner and similar soils: 6 percent of the unit  
 Connieo and similar soils: 5 percent of the unit  
 Clasoil and similar soils: 4 percent of the unit  
 Farnuf and similar soils: 3 percent of the unit  
 Rock outcrop: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1283E—Crackerville-Bielenberg-Catgulch, bouldery, complex, 20 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Crackerville and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 20 to 35 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*

Gravelly colluvium derived from granite over sandy and gravelly residuum derived from granite  
 Gravelly residuum derived from granite  
 Gravelly slope alluvium derived from granite over sandy and gravelly residuum derived from granite

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.3 inches

#### **Bielenberg and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Hillsides, ridges  
*Slope:* 20 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Depth to restrictive feature:* 40 to 50 inches to bedrock (paralithic); 50 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained

#### *Parent material:*

Fine-loamy colluvium derived from granite over residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.4 inches

### **Catgulch and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs  
*Slope:* 20 to 35 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.1 inches

### **Additional Components**

Burtoner and similar soils: 5 percent of the unit  
 Connieo and similar soils: 4 percent of the unit  
 Clasoil and similar soils: 2 percent of the unit  
 Farnuf and similar soils: 2 percent of the unit  
 Rock outcrop: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1286E—Crackerville-Bielenberg-Catgulch, bouldery, complex, 15 to 35 percent slopes, warm**

### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

### **Component Description**

#### **Crackerville and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Gravelly sandy clay loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from granite over sandy and gravelly residuum derived from granite

Gravelly residuum derived from granite

Gravelly slope alluvium derived from granite over sandy and gravelly residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.3 inches

### **Bielenberg and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Gravelly loam

*Depth to restrictive feature:* 40 to 50 inches to bedrock (paralithic); 50 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from granite over residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.4 inches

### **Catgulch and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs

*Slope:* 15 to 35 percent

*Surface layer texture:* Gravelly sandy clay loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.1 inches

### **Additional Components**

Bielenberg soils that have slopes of less than 15 percent: 7 percent of the unit

Clancy and similar soils: 5 percent of the unit

Rock outcrop: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1287E—Clancy, very stony-Crampton, bouldery-Bielenberg, very stony, complex, 15 to 45 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, uplands, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

### **Component Description**

#### **Clancy and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hills, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:* Fine-loamy colluvium derived from granite over sandy and gravelly residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.8 inches

#### **Crampton and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Escarpments, hills, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Very cobbly sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over sandy and gravelly  
residuum derived from granite

Gravelly residuum derived from granite

Gravelly slope alluvium over sandy and gravelly  
residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.5 inches

**Bielenberg and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Sandy clay loam

*Percent of surface covered by rock fragments:* 0.10 to  
3.00 percent (stones)

*Depth to restrictive feature:* 40 to 50 inches to bedrock  
(paralithic); 50 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from granite over  
residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium derived from granite  
over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.2 inches

**Additional Components**

Burtoner and similar soils: 5 percent of the unit

Baxton and similar soils: 3 percent of the unit

Connieo and similar soils: 3 percent of the unit

Bielenberg soils that have slopes of less than 15  
percent: 2 percent of the unit

Rock outcrop: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1321B—Beaverell, very stony-Beaverell-Sieberell, stony, complex, 1 to 4 percent slopes****Map Unit Setting**

*Landscape:* Valleys, uplands, river valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

**Component Description****Beaverell, very stony, and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, plains

*Slope:* 1 to 4 percent

*Surface layer texture:* Very cobbly sandy clay loam

*Percent of surface covered by rock fragments:* 0.10 to  
3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Gravelly alluvium over sandy and  
gravelly alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.8 inches

**Beaverell and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, plains

*Slope:* 1 to 4 percent

*Surface layer texture:* Very cobbly sandy clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Gravelly alluvium over sandy and  
gravelly alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.8 inches

**Sieberell and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides,  
terraces

*Slope:* 1 to 4 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to  
0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, gravelly slope alluvium  
over sandy and gravelly slope alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

**Additional Components**

Attewan and similar soils: 3 percent of the unit

Geohrock and similar soils: 3 percent of the unit

Bronec and similar soils: 2 percent of the unit

Meadowcreek and similar soils: 2 percent of the  
unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1321D—Beaverell, very stony-Sieberell, stony, complex, 4 to 15 percent slopes****Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

**Component Description****Beaverell and similar soils**

*Extent:* 55 percent of the map unit

*Geomorphic position:* Alluvial fans, plains

*Slope:* 4 to 15 percent

*Surface layer texture:* Very cobbly sandy clay loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Gravelly alluvium over sandy and gravelly alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.8 inches

**Sieberell and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 4 to 15 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Calcareous, gravelly slope alluvium over sandy and gravelly slope alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

**Additional Components**

Attewan and similar soils: 3 percent of the unit

Geohrock and similar soils: 3 percent of the unit

Bronec and similar soils: 2 percent of the unit

Sappington and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1322D—Beaverell, stony-Beaverell, rubbly-Sieberell, stony, complex, 2 to 15 percent slopes****Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

**Component Description****Beaverell, stony, and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, plains

*Slope:* 2 to 15 percent

*Surface layer texture:* Extremely cobbly sandy clay loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Gravelly alluvium over sandy and gravelly alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.6 inches

**Beaverell, rubbly, and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, plains

*Slope:* 2 to 15 percent

*Surface layer texture:* Stony loam

*Percent of surface covered by rock fragments:* 15 to 50 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Gravelly alluvium over sandy and gravelly alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.8 inches

**Sieberell and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 2 to 15 percent

*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, gravelly slope alluvium over sandy and gravelly slope alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.2 inches

### **Additional Components**

Attewan and similar soils: 3 percent of the unit  
 Geohrock and similar soils: 3 percent of the unit  
 Bronec and similar soils: 2 percent of the unit  
 Sappington and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1331A—Bonebasin-Wetsand complex, 0 to 2 percent slopes**

### **Map Unit Setting**

*Landscape:* Valleys, river valleys  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 16 inches  
*Frost-free period:* 90 to 115 days

### **Component Description**

#### **Bonebasin and similar soils**

*Extent:* 55 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Very poorly drained  
*Parent material:* Organic material over fine-loamy alluvium and sandy and gravelly alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 5.6 inches

#### **Wetsand and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 2 percent  
*Surface layer texture:* Clay loam  
*Restrictive feature:* None noted

*Drainage class:* Poorly drained  
*Parent material:* Loamy alluvium over sandy and gravelly recent alluvium derived from mixed igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 3.7 inches

### **Additional Components**

Riverrun and similar soils: 5 percent of the unit  
 Clunton and similar soils: 4 percent of the unit  
 Mckenton and similar soils: 3 percent of the unit  
 Meadowcreek and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1341D—Windham very gravelly loam, 2 to 15 percent slopes, very stony**

### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,000 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Windham and similar soils**

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from limestone  
     Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.5 inches

### **Additional Components**

Maiden and similar soils: 4 percent of the unit  
 Judell and similar soils: 3 percent of the unit  
 Lap and similar soils: 3 percent of the unit  
 Windham, very cobbly, and similar soils: 3 percent of the unit  
 Rock outcrop: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1342E—Windham-Lap very cobbly loams, 15 to 45 percent slopes, bouldery

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

### Component Description

#### Windham and similar soils

*Extent:* 65 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from limestone

Gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.9 inches

#### Lap and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from limestone

Gravelly residuum derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

### Additional Components

Lap, very gravelly, and similar soils: 3 percent of the unit

Shawmut and similar soils: 3 percent of the unit

Maiden and similar soils: 2 percent of the unit

Rock outcrop: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1343D—Windham-Judell very cobbly loams, 4 to 15 percent slopes, bouldery

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

### Component Description

#### Windham and similar soils

*Extent:* 60 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from limestone

Gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.9 inches

#### Judell and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 4 to 15 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from limestone

Fine-loamy slope alluvium derived from limestone

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 7.3 inches

### Additional Components

Maiden and similar soils: 4 percent of the unit  
 Lap and similar soils: 3 percent of the unit  
 Shawmut and similar soils: 3 percent of the unit

### Management

• For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1351D—Perma stony loam, 2 to 15 percent slopes, very bouldery

### Map Unit Setting

*Landscape:* Uplands, foothills, mountains, river valleys  
*Elevation:* 4,200 to 6,000 feet  
*Mean annual precipitation:* 12 to 19 inches  
*Frost-free period:* 80 to 105 days

### Component Description

#### Perma and similar soils

*Extent:* 80 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Stony loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*

Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.3 inches

### Additional Components

Catgulch and similar soils: 5 percent of the unit  
 Placerton and similar soils: 5 percent of the unit  
 Whitlash and similar soils: 4 percent of the unit  
 Clunton and similar soils: 3 percent of the unit  
 Cometcrik and similar soils: 3 percent of the unit

### Management

• For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1352E—Perma-Whitlash complex, 15 to 35 percent slopes, bouldery, warm

### Map Unit Setting

*Landscape:* Uplands, foothills  
*Elevation:* 4,400 to 6,500 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

### Component Description

#### Perma and similar soils

*Extent:* 70 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*

Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.4 inches

#### Whitlash and similar soils

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

### **Additional Components**

Perma soils that have slopes of more than 35 percent:  
4 percent of the unit

Sawicki and similar soils: 3 percent of the unit

Vigilante and similar soils: 3 percent of the unit

Wimper and similar soils: 3 percent of the unit

Rock outcrop: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1353F—Perma, very stony-Whitlash, very stony-Rock outcrop complex, 15 to 45 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,500 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

### **Component Description**

#### **Perma and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.4 inches

#### **Whitlash and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.1 inches

### **Rock outcrop**

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard sedimentary, metamorphic, and fine grained volcanic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

### **Additional Components**

Perma, cool, and similar soils: 6 percent of the unit

Perma, moist, and similar soils: 4 percent of the unit

Sawicki and similar soils: 4 percent of the unit

Vigilante and similar soils: 3 percent of the unit

Wimper and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1355D—Wimper-Wimper, stony, complex, 4 to 15 percent slopes, warm**

### **Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

### **Component Description**

#### **Wimper and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 4 to 15 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly colluvium derived from basalt  
 Calcareous, gravelly colluvium derived from fine  
 grained sandstone

Calcareous, gravelly slope alluvium derived from  
 basalt

Calcareous, gravelly slope alluvium derived from  
 fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.6 inches

**Wimper, stony, and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 4 to 15 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to  
 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly colluvium derived from basalt

Calcareous, gravelly colluvium derived from fine  
 grained sandstone

Calcareous, gravelly slope alluvium derived from  
 basalt

Calcareous, gravelly slope alluvium derived from  
 fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.4 inches

**Additional Components**

Wimper soils that have slopes of more than 15  
 percent: 6 percent of the unit

Shawmut and similar soils: 5 percent of the unit

Windham and similar soils: 5 percent of the unit

Martinsdale and similar soils: 4 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1355E—Wimper-Wimper, stony, complex,  
15 to 35 percent slopes, warm****Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

**Component Description****Wimper and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 15 to 35 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly colluvium derived from basalt

Calcareous, gravelly colluvium derived from fine  
 grained sandstone

Calcareous, gravelly slope alluvium derived from  
 basalt

Calcareous, gravelly slope alluvium derived from  
 fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.6 inches

**Wimper, stony, and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 15 to 35 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to  
 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly colluvium derived from  
 basalt

Calcareous, gravelly colluvium derived from fine  
 grained sandstone

Calcareous, gravelly slope alluvium derived from  
 basalt

Calcareous, gravelly slope alluvium derived from  
 fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.4 inches

**Additional Components**

Wimper soils that have slopes of more than 35  
 percent: 7 percent of the unit

Shawmut and similar soils: 5 percent of the unit

Windham and similar soils: 5 percent of the unit

Martinsdale and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1356E—Wimper gravelly loam, 8 to 35 percent slopes, stony, moist****Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

**Component Description****Wimper and similar soils**

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 8 to 35 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly colluvium derived from basalt

Calcareous, gravelly colluvium derived from fine grained sandstone

Calcareous, gravelly slope alluvium derived from basalt

Calcareous, gravelly slope alluvium derived from fine grained sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.4 inches

**Additional Components**

Shawmut and similar soils: 8 percent of the unit

Windham and similar soils: 7 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1357F—Perma, very bouldery-Shaboom, extremely bouldery-Rock outcrop complex, 35 to 60 percent slopes****Map Unit Setting**

*Landscape:* Uplands, foothills, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

**Component Description****Perma and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Stony loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.3 inches

**Shaboom and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Sandy loam

*Percent of surface covered by rock fragments:* 3 to 15 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from granite

Gravelly slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

**Rock outcrop**

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

**Additional Components**

Kellygulch and similar soils: 10 percent of the unit

Baxton and similar soils: 5 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1361E—Lumpgulch, bouldery-Rock outcrop-Elmark, bouldery, complex, 8 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Lumpgulch and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*

Fine-loamy colluvium derived from granite over residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.3 inches

#### Rock outcrop

*Extent:* 20 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

#### Elmark and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, mountainsides, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained

#### Parent material:

Fine-loamy colluvium over sandy and gravelly residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium over sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.7 inches

### Additional Components

Shaboom and similar soils: 6 percent of the unit  
 Kellygulch and similar soils: 5 percent of the unit  
 Connieo and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1362F—Lumpgulch, bouldery-Rock outcrop complex, 25 to 60 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Lumpgulch and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*

Fine-loamy colluvium derived from granite over residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.3 inches

#### Rock outcrop

*Extent:* 35 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### **Additional Components**

Elmark and similar soils: 6 percent of the unit  
Shaboom and similar soils: 5 percent of the unit  
Kellygulch and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1372D—Burtoner-Connieo, bouldery-Rock outcrop complex, 4 to 15 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Burtoner and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Sandy clay loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*

- Fine-loamy alluvium over residuum derived from granite
- Fine-loamy colluvium over residuum derived from granite
- Fine-loamy residuum derived from granite

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.6 inches

#### **Connieo and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Sandy clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)

*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.3 inches

### **Rock outcrop**

*Extent:* 15 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### **Additional Components**

Baxton and similar soils: 5 percent of the unit  
Breeton and similar soils: 3 percent of the unit  
Ashbray and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1373E—Burtoner-Elmark-Connieo complex, 8 to 25 percent slopes, very bouldery**

### **Map Unit Setting**

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

### **Component Description**

#### **Burtoner and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Sandy clay loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*

- Fine-loamy alluvium over residuum derived from granite
- Fine-loamy colluvium over residuum derived from granite
- Fine-loamy residuum derived from granite

*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.6 inches

**Elmark and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, mountainsides, ridges  
*Slope:* 8 to 25 percent  
*Surface layer texture:* Gravelly coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium over sandy and gravelly residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium over sandy and gravelly residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.5 inches

**Connieo and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.9 inches

**Additional Components**

Shaboom and similar soils: 5 percent of the unit  
 Rock outcrop: 4 percent of the unit  
 Ashbray and similar soils: 2 percent of the unit  
 Baxton and similar soils: 2 percent of the unit  
 Tolbert and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1374D—Burtoner-Clancy-Connieo complex, 4 to 15 percent slopes****Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

**Component Description****Burtoner and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Sandy clay loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy alluvium over residuum derived from granite  
 Fine-loamy colluvium over residuum derived from granite  
 Fine-loamy residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.6 inches

**Clancy and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Escarpments, hills, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Sandy clay loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Fine-loamy colluvium derived from granite over sandy and gravelly residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.2 inches

**Connieo and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.1 inches

**Additional Components**

Burtoner soils that have slopes of more than 15 percent: 5 percent of the unit

Clancy soils that have slopes of more than 15 percent:  
4 percent of the unit

Connieo soils that have slopes of more than 15 percent:  
3 percent of the unit

Bielenberg and similar soils: 2 percent of the unit

Rock outcrop: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1375D—Burtoner-Connieo, bouldery-Rock outcrop complex, 4 to 15 percent slopes, warm

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

### Component Description

#### Burtoner and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Sandy clay loam

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy alluvium over residuum derived from granite

Fine-loamy colluvium over residuum derived from granite

Fine-loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.6 inches

#### Connieo and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Sandy clay loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.3 inches

### Rock outcrop

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Burtoner soils that have slopes of more than 15 percent:  
3 percent of the unit of the unit

Clancy and similar soils: 3 percent of the unit

Bielenberg and similar soils: 2 percent of the unit

Crampton and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1375E—Burtoner, very stony-Connieo, bouldery-Rock outcrop complex, 15 to 45 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

### Component Description

#### Burtoner and similar soils

*Extent:* 55 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy alluvium over residuum derived from granite

Fine-loamy colluvium over residuum derived from granite

Fine-loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

### **Connieo and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

### **Rock outcrop**

*Extent:* 10 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### **Additional Components**

Clancy and similar soils: 7 percent

Crampton and similar soils: 5 percent

Bielenberg and similar soils: 3 percent

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1376F—Burtone, very stony-Connieo, very stony-Rock outcrop complex, 35 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, uplands, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Burtone and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy alluvium over residuum derived from granite

Fine-loamy colluvium over residuum derived from granite

Fine-loamy residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

### **Connieo and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

### **Rock outcrop**

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### **Additional Components**

Ashbray and similar soils: 10 percent of the unit

Kellygulch and similar soils: 8 percent of the unit

Placerton and similar soils: 5 percent of the unit

Breeton and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1377E—Burtone, very stony-Crampton, bouldery-Catgulch, bouldery, complex, 15 to 45 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

### Component Description

#### Burtoner and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy alluvium over residuum derived from granite

Fine-loamy colluvium over residuum derived from granite

Fine-loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

#### Crampton and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Escarpments, hills, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Very cobbly sandy clay loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over sandy and gravelly residuum derived from granite

Gravelly residuum derived from granite

Gravelly slope alluvium over sandy and gravelly residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.7 inches

#### Catgulch and similar soils

*Extent:* 15 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs

*Slope:* 15 to 45 percent

*Surface layer texture:* Cobbly sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

### Additional Components

Clancy and similar soils: 5 percent of the unit

Bielenberg and similar soils: 4 percent of the unit

Rock outcrop: 3 percent of the unit

Sawicki and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1378E—Burtoner-Elmark-Shaboom, very bouldery, complex, 15 to 45 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

### Component Description

#### Burtoner and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Sandy loam

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy alluvium over residuum derived from granite

Fine-loamy colluvium over residuum derived from granite

Fine-loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

#### Elmark and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, mountainsides, ridges

*Slope:* 15 to 45 percent  
*Surface layer texture:* Sandy loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium over sandy and gravelly residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium over sandy and gravelly residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.7 inches

#### **Shaboom and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Gravelly sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from granite  
 Gravelly slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

#### **Additional Components**

Clancy and similar soils: 4 percent of the unit  
 Hoyt and similar soils: 3 percent of the unit  
 Placerton and similar soils: 3 percent of the unit  
 Rock outcrop: 3 percent of the unit  
 Bielenberg and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1381D—Jeffcity, stony-Connieo, stony-Rock outcrop complex, 2 to 15 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 12 to 19 inches  
*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Jeffcity and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.4 inches

##### **Connieo and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.0 inches

##### **Rock outcrop**

*Extent:* 15 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

#### **Additional Components**

Ashbray and similar soils: 4 percent of the unit  
 Cedric and similar soils: 4 percent of the unit  
 Connieo, bouldery, and similar soils: 4 percent of the unit  
 Connieo soils that are not stony: 4 percent of the unit  
 Placerton and similar soils: 4 percent of the unit

#### **Management**

- For information about managing this map unit,

see the appropriate sections in Part II of this publication.

### **1391B—Bronec fine sandy loam, 1 to 4 percent slopes**

#### **Map Unit Setting**

*Landscape:* Valleys, uplands  
*Elevation:* 3,800 to 5,000 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 115 days

#### **Component Description**

##### **Bronec and similar soils**

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, valley floors  
*Slope:* 1 to 4 percent  
*Surface layer texture:* Fine sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Sandy and gravelly, calcareous alluvium  
     Sandy and gravelly, calcareous slope alluvium  
     Sandy and gravelly, calcareous Tertiary valley fill alluvium  
     Sandy and gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 6.9 inches

#### **Additional Components**

Beaverell and similar soils: 6 percent of the unit  
 Sieberell and similar soils: 5 percent of the unit  
 Bronec, stony, and similar soils: 4 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1451F—Blaincreek, very stony-Sawicki, very stony-Tolbert, very bouldery, complex, 35 to 70 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Blaincreek and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly alluvium over residuum derived from basalt  
     Gravelly colluvium over residuum derived from basalt  
     Gravelly residuum derived from basalt  
     Gravelly slope alluvium over residuum derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.4 inches

##### **Sawicki and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, mountain slopes  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from basalt  
     Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.3 inches

##### **Tolbert and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, interfluves, ridges  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.0 inch

### **Additional Components**

Perma and similar soils: 3 percent of the unit

Wickes and similar soils: 3 percent of the unit

Rock outcrop: 2 percent of the unit

Sawbuck and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1460C—Clasoil loam, 2 to 8 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, uplands, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

### **Component Description**

#### **Clasoil and similar soils**

*Extent:* 80 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides

*Slope:* 2 to 8 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Fine-loamy alluvium derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.2 inches

### **Additional Components**

Farnuf and similar soils: 6 percent of the unit

Bielenberg and similar soils: 5 percent of the unit

Placerton and similar soils: 5 percent of the unit

Breeton and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1461D—Bielenberg-Burtoner, very stony-Catgulch, bouldery, complex, 8 to 25 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, uplands, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

### **Component Description**

#### **Bielenberg and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Hillsides, ridges

*Slope:* 8 to 15 percent

*Surface layer texture:* Sandy clay loam

*Depth to restrictive feature:* 40 to 50 inches to bedrock (paralithic); 50 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from granite over residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.7 inches

#### **Burtoner and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 8 to 25 percent

*Surface layer texture:* Sandy clay loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy alluvium over residuum derived from granite

Fine-loamy colluvium over residuum derived from granite

Fine-loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.6 inches

#### **Catgulch and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs

*Slope:* 8 to 25 percent

*Surface layer texture:* Gravelly sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

### Additional Components

Clancy and similar soils: 5 percent of the unit

Baxton and similar soils: 3 percent of the unit

Rock outcrop: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1540F—Shaboom, extremely bouldery-Rock outcrop-Elmark, very bouldery, association, 35 to 60 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Shaboom and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Sandy loam

*Percent of surface covered by rock fragments:* 3 to 15 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from granite

Gravelly slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

#### Rock outcrop

*Extent:* 30 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

#### Elmark and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, mountainsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium over sandy and gravelly residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium over sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.6 inches

### Additional Components

Ashbray and similar soils: 6 percent of the unit

Lumpgulch and similar soils: 5 percent of the unit

Kellygulch and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1541E—Shaboom, bouldery-Lumpgulch, very bouldery-Rock outcrop complex, 8 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Shaboom and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Gravelly sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from granite  
 Gravelly slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

#### **Lumpgulch and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 8 to 25 percent  
*Surface layer texture:* Gravelly coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium derived from granite over residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 2.8 inches

#### **Rock outcrop**

*Extent:* 25 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

#### **Additional Components**

Elmark and similar soils: 4 percent of the unit  
 Ashbray and similar soils: 3 percent of the unit  
 Kellygulch and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1542E—Shaboom, very bouldery-Rock outcrop-Kellygulch, very bouldery, complex, 8 to 35 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

#### **Component Description**

##### **Shaboom and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Gravelly sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from granite  
 Gravelly slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

##### **Rock outcrop**

*Extent:* 30 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

##### **Kellygulch and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Coarse-loamy colluvium over residuum derived from granite  
 Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.0 inches

### Additional Components

Elmark and similar soils: 6 percent of the unit

Lumpgulch and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1543E—Shaboom, very bouldery-Kellygulch, very bouldery-Rock outcrop complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Shaboom and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from granite

Gravelly slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

#### Kellygulch and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy colluvium over residuum derived from granite

Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.0 inches

### Rock outcrop

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Ashbray and similar soils: 6 percent of the unit

Elmark and similar soils: 5 percent of the unit

Breeton and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1543F—Shaboom, extremely bouldery-Kellygulch, extremely bouldery-Rock outcrop complex, 35 to 60 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Shaboom and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 3 to 15 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from granite  
 Gravelly slope alluvium derived from granite over  
 residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

**Kellygulch and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides,  
ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 3 to 15  
percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy colluvium over residuum derived  
from granite

Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium over residuum  
derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.0 inches

**Rock outcrop**

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed  
areas of hard, coarse grained granite bedrock. In  
places, a thin layer of decomposing granite (grus)  
covers the bedrock. Large, rounded boulders of  
granite are in the vicinity of the outcrops.

**Additional Components**

Ashbray and similar soils: 6 percent of the unit

Elmark and similar soils: 4 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1544E—Shaboom, bouldery-Kellygulch, bouldery-Rock outcrop complex, 8 to 45 percent slopes**

**Map Unit Setting**

*Landscape:* Foothills, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

**Component Description****Shaboom and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 8 to 45 percent

*Surface layer texture:* Gravelly sandy loam

*Percent of surface covered by rock fragments:* 0.01 to  
0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from granite

Gravelly slope alluvium derived from granite over  
residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

**Kellygulch and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides,  
ridges

*Slope:* 8 to 45 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to  
0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy colluvium over residuum derived  
from granite

Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium over residuum  
derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.0 inches

**Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of  
exposed areas of hard, coarse grained granite  
bedrock. In places, a thin layer of decomposing  
granite (grus) covers the bedrock. Large, rounded  
boulders of granite are in the vicinity of the  
outcrops.

### Additional Components

Elmark and similar soils: 6 percent of the unit  
Lumpgulch and similar soils: 5 percent of the unit  
Hoyt and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1563D—Hilger, rubbly-Hilger complex, 8 to 25 percent slopes

### Map Unit Setting

*Landscape:* Uplands, foothills, valleys  
*Elevation:* 4,000 to 6,000 feet  
*Mean annual precipitation:* 12 to 19 inches  
*Frost-free period:* 80 to 105 days

### Component Description

#### Hilger, rubbly, and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides  
*Slope:* 8 to 25 percent  
*Surface layer texture:* Stony loam  
*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly colluvium derived from basalt  
Gravelly colluvium derived from fine grained sandstone  
Gravelly slope alluvium derived from basalt  
Gravelly slope alluvium derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.0 inches

#### Hilger and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides  
*Slope:* 8 to 25 percent  
*Surface layer texture:* Very cobbly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly colluvium derived from basalt

Gravelly colluvium derived from fine grained sandstone  
Gravelly slope alluvium derived from basalt  
Gravelly slope alluvium derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.2 inches

### Additional Components

Shawmut and similar soils: 5 percent of the unit  
Tolbert and similar soils: 4 percent of the unit  
Sieben and similar soils: 3 percent of the unit  
Brickner and similar soils: 2 percent of the unit  
Rock outcrop: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1564E—Hilger, very stony-Hilger, rubbly-Rock outcrop complex, 8 to 35 percent slopes

### Map Unit Setting

*Landscape:* Uplands, foothills  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

### Component Description

#### Hilger, very stony, and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly colluvium derived from basalt  
Gravelly colluvium derived from fine grained sandstone  
Gravelly slope alluvium derived from basalt  
Gravelly slope alluvium derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.2 inches

**Hilger, rubbly, and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Stony loam  
*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from fine grained sandstone  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.0 inches

**Rock outcrop**

*Extent:* 8 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

**Additional Components**

Rubble land: 7 percent of the unit  
 Martinsdale and similar soils: 5 percent of the unit  
 Shawmut and similar soils: 5 percent of the unit  
 Wickes and similar soils: 5 percent of the unit  
 Brickner and similar soils: 4 percent of the unit  
 Tolbert and similar soils: 4 percent of the unit  
 Gnojek and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1591E—Catgulch, bouldery-Crackerville-Rock outcrop complex, 15 to 45 percent slopes****Map Unit Setting**

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

**Component Description****Catgulch and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.1 inches

**Crackerville and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from granite over sandy and gravelly residuum derived from granite  
 Gravelly residuum derived from granite  
 Gravelly slope alluvium derived from granite over sandy and gravelly residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.3 inches

**Rock outcrop**

*Extent:* 15 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

**Additional Components**

Baxton and similar soils: 2 percent of the unit  
 Breton and similar soils: 2 percent of the unit  
 Burtoner and similar soils: 2 percent of the unit

Connieo and similar soils: 2 percent of the unit

Elmark and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1595E—Connieo, bouldery-Crackerville-Rock outcrop complex, 15 to 45 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

### Component Description

#### Connieo and similar soils

*Extent:* 50 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Sandy clay loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.3 inches

#### Crackerville and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Gravelly sandy clay loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from granite over sandy and gravelly residuum derived from granite

Gravelly residuum derived from granite

Gravelly slope alluvium derived from granite over sandy and gravelly residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.3 inches

### Rock outcrop

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Burtoner and similar soils: 7 percent of the unit

Bielenberg and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1596C—Connieo-Rock outcrop-Placerton complex, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Connieo and similar soils

*Extent:* 55 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 2 to 8 percent

*Surface layer texture:* Coarse sandy loam

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

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

#### Rock outcrop

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

#### Placerton and similar soils

*Extent:* 15 percent of the map unit

*Geomorphic position:* Divides, hillsides, mountain slopes, ridges

*Slope:* 2 to 8 percent  
*Surface layer texture:* Sandy loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium over residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.0 inches

#### **Additional Components**

Jeffcity and similar soils: 5 percent of the unit  
 Baxton and similar soils: 3 percent of the unit  
 Bielenberg and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1602C—Farnuf-Placerton sandy clay loams, 2 to 8 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Farnuf and similar soils**

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Sandy clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy alluvium derived from granite  
 Fine-loamy alluvium derived from sandstone-shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.7 inches

##### **Placerton and similar soils**

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Divides, hillsides, mountain slopes, ridges

*Slope:* 2 to 8 percent  
*Surface layer texture:* Sandy clay loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium over residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.3 inches

#### **Additional Components**

Kounter and similar soils: 4 percent of the unit  
 Connieo and similar soils: 3 percent of the unit  
 Martinsdale and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1603C—Farnuf sandy loam, 2 to 8 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands, mountains, river valleys, valleys  
*Elevation:* 3,940 to 6,000 feet  
*Mean annual precipitation:* 12 to 19 inches  
*Frost-free period:* 80 to 105 days

#### **Component Description**

##### **Farnuf and similar soils**

*Extent:* 95 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy alluvium derived from granite  
 Fine-loamy alluvium derived from sandstone-shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.4 inches

#### **Additional Components**

Faith and similar soils: 2 percent of the unit  
 Placerton and similar soils: 2 percent of the unit  
 Martinsdale and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1604D—Farnuf-Farnuf, stony-Burtoner complex, 4 to 15 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Farnuf and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy alluvium derived from granite  
 Fine-loamy alluvium derived from sandstone-shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.7 inches

#### Farnuf, stony, and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy alluvium derived from granite  
 Fine-loamy alluvium derived from sandstone-shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.7 inches

#### Burtoner and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Sandy loam

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy alluvium over residuum derived from granite

Fine-loamy colluvium over residuum derived from granite

Fine-loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

### Additional Components

Placerton and similar soils: 5 percent of the unit

Kounter and similar soils: 4 percent of the unit

Breeton and similar soils: 3 percent of the unit

Clancy and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1605C—Farnuf-Placerton sandy clay loams, 2 to 8 percent slopes, warm

### Map Unit Setting

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

### Component Description

#### Farnuf and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Sandy clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy alluvium derived from granite  
 Fine-loamy alluvium derived from sandstone-shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.7 inches

#### Placerton and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Divides, hillsides, mountain slopes, ridges  
*Slope:* 2 to 8 percent

*Surface layer texture:* Sandy clay loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium over residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.3 inches

#### **Additional Components**

Jeffcity and similar soils: 7 percent of the unit  
 Connieo and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1606D—Farnuf loam, 2 to 15 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Farnuf and similar soils**

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy alluvium derived from granite  
 Fine-loamy alluvium derived from sandstone-shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.7 inches

#### **Additional Components**

Connieo and similar soils: 4 percent of the unit  
 Placerton and similar soils: 4 percent of the unit  
 Martinsdale and similar soils: 3 percent of the unit  
 Bielenberg and similar soils: 2 percent of the unit  
 Burtoner and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1607D—Farnuf-Placerton-Martinsdale complex, 4 to 15 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Farnuf and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy alluvium derived from granite  
 Fine-loamy alluvium derived from sandstone-shale  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.7 inches

##### **Placerton and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Divides, hillsides, mountain slopes, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Sandy loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium over residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.0 inches

##### **Martinsdale and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, fine-loamy alluvium derived from granite

Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.2 inches

### **Additional Components**

Connieo and similar soils: 3 percent of the unit

Kounter and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1621D—Connieo, stony-Baxton, stony-Rock outcrop complex, 2 to 15 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, uplands, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

### **Component Description**

#### **Connieo and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 2 to 15 percent

*Surface layer texture:* Sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.0 inches

#### **Baxton and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Hillsides, mountainsides, ridges

*Slope:* 2 to 15 percent

*Surface layer texture:* Sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Somewhat excessively drained

*Parent material:*

Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium derived from granite over residuum derived from granite

Sandy colluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

### **Rock outcrop**

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### **Additional Components**

Ashbray and similar soils: 2 percent of the unit

Clancy and similar soils: 2 percent of the unit

Connieo soils that are not stony: 2 percent of the unit

Farnuf and similar soils: 2 percent of the unit

Placerton and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1621E—Connieo, very stony-Baxton, stony-Rock outcrop complex, 15 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, uplands, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Connieo and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.0 inches

#### **Baxton and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Hillsides, mountainsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
 Coarse-loamy residuum derived from granite  
 Coarse-loamy slope alluvium derived from granite over residuum derived from granite  
 Sandy colluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.1 inches

#### **Rock outcrop**

*Extent:* 25 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

#### **Additional Components**

Ashbray and similar soils: 3 percent of the unit  
 Catgulch and similar soils: 3 percent of the unit  
 Breeton and similar soils: 2 percent of the unit  
 Jeffcity and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1622D—Connieo, moist-Rock outcrop complex, 2 to 15 percent slopes**

#### **Map Unit Setting**

*Landscape:* Uplands, foothills, mountains

*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Connieo and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.9 inches

##### **Rock outcrop**

*Extent:* 30 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

#### **Additional Components**

Ashbray and similar soils: 6 percent of the unit  
 Baxton and similar soils: 5 percent of the unit  
 Burtoner and similar soils: 5 percent of the unit  
 Breeton and similar soils: 4 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1623D—Connieo-Burtoner complex, 2 to 15 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Connieo and similar soils**

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Coarse sandy loam

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

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

#### **Burtoner and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 2 to 15 percent

*Surface layer texture:* Sandy loam

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy alluvium over residuum derived from granite

Fine-loamy colluvium over residuum derived from granite

Fine-loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

#### **Additional Components**

Kellygulch and similar soils: 6 percent of the unit

Breeton and similar soils: 4 percent of the unit

Placerton and similar soils: 3 percent of the unit

Ashbray and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1623E—Connieo-Baxton-Rock outcrop complex, 15 to 35 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

#### **Component Description**

##### **Connieo and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Coarse sandy loam

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

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

#### **Baxton and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Hillsides, mountainsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Loam

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Somewhat excessively drained

*Parent material:*

Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium derived from granite over residuum derived from granite

Sandy colluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.6 inches

#### **Rock outcrop**

*Extent:* 10 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

#### **Additional Components**

Kellygulch and similar soils: 6 percent of the unit

Ashbray and similar soils: 4 percent of the unit

Breeton and similar soils: 3 percent of the unit

Jeffcity and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1624F—Connieo, very stony-Baxton, bouldery-Rock outcrop complex, 35 to 60 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

## Component Description

### Connieo and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.9 inches

### Baxton and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Hillsides, mountainsides, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
 Coarse-loamy residuum derived from granite  
 Coarse-loamy slope alluvium derived from granite over residuum derived from granite  
 Sandy colluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.1 inches

### Rock outcrop

*Extent:* 15 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

## Additional Components

Ashbray and similar soils: 6 percent of the unit  
 Breton and similar soils: 4 percent of the unit  
 Jeffcity and similar soils: 3 percent of the unit  
 Kellygulch and similar soils: 2 percent of the unit

## Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 1625F—Connieo, extremely bouldery-Rock outcrop-Burtoner, extremely stony, complex, 35 to 60 percent slopes

## Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

## Component Description

### Connieo and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Gravelly coarse sandy loam  
*Percent of surface covered by rock fragments:* 3 to 15 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.7 inches

### Rock outcrop

*Extent:* 30 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Burtoner and similar soils

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 35 to 50 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 3 to 15 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy alluvium over residuum derived from granite

Fine-loamy colluvium over residuum derived from granite

Fine-loamy residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

### Additional Components

Ashbray and similar soils: 6 percent of the unit

Shaboom and similar soils: 4 percent of the unit

Kellygulch and similar soils: 3 percent of the unit

Breeton and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1626D—Connieo, bouldery-Burtoner, bouldery-Rock outcrop complex, 4 to 15 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Connieo and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

#### Burtoner and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy alluvium over residuum derived from granite

Fine-loamy colluvium over residuum derived from granite

Fine-loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

### Rock outcrop

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Ashbray and similar soils: 4 percent of the unit

Baxton and similar soils: 4 percent of the unit

Bielenberg and similar soils: 4 percent of the unit

Breeton and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1627E—Connieo, very bouldery-Burtoner-Rock outcrop complex, 8 to 35 percent slopes, moist

### Map Unit Setting

*Landscape:* Foothills, uplands, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

### Component Description

#### Connieo and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 2.1 inches

#### **Burtoner and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Sandy clay loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy alluvium over residuum derived from granite  
 Fine-loamy colluvium over residuum derived from granite  
 Fine-loamy residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.6 inches

#### **Rock outcrop**

*Extent:* 10 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

#### **Additional Components**

Placerton and similar soils: 6 percent of the unit  
 Clancy and similar soils: 4 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1628D—Connieo, bouldery-Ashbray, very bouldery-Rock outcrop complex, 2 to 15 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

#### **Component Description**

##### **Connieo and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.9 inches

#### **Ashbray and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Gravelly coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:* Sandy and gravelly residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.0 inch

#### **Rock outcrop**

*Extent:* 10 percent of the map unit  
*Definition:* This component consists mainly of exposed hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock.

#### **Additional Components**

Rubble land: 10 percent of the unit  
 Catgulch and similar soils: 4 percent of the unit  
 Breeton and similar soils: 3 percent of the unit  
 Jeffcity and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1629C—Connieo-Catgulch-Rock outcrop complex, 2 to 8 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Connieo and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 2 to 8 percent

*Surface layer texture:* Coarse sandy loam

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

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

#### Catgulch and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs

*Slope:* 2 to 8 percent

*Surface layer texture:* Gravelly coarse sandy loam

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

#### Rock outcrop

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Bielenberg and similar soils: 2 percent of the unit

Breton and similar soils: 2 percent of the unit

Burtoner and similar soils: 2 percent of the unit

Clancy and similar soils: 2 percent of the unit

Crackerville and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1640D—Nieman, very stony-Rock outcrop-Libeg, stony, complex, 2 to 15 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 8,000 feet

*Mean annual precipitation:* 15 to 30 inches

*Frost-free period:* 30 to 70 days

### Component Description

#### Nieman and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, mountain slopes, ridges

*Slope:* 2 to 15 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.4 inches

#### Rock outcrop

*Extent:* 30 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock. Boulders and stones make up a small part of the areas.

#### Libeg and similar soils

*Extent:* 15 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces

*Slope:* 2 to 15 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly alluvium

Gravelly colluvium

Gravelly slope alluvium

Gravelly till

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.7 inches

### Additional Components

Surdal and similar soils: 5 percent of the unit

Marcel and similar soils: 4 percent of the unit

Sebud and similar soils: 3 percent of the unit

Tibkey and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1641E—Nieman, very stony-Rock outcrop-Libeg, bouldery, complex, 15 to 45 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Nieman and similar soils

*Extent:* 50 percent of the map unit

*Geomorphic position:* Escarpments, mountain slopes, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.4 inches

#### Rock outcrop

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock. Boulders and stones make up a small part of the areas.

### Libeg and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces

*Slope:* 15 to 45 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly alluvium

Gravelly colluvium

Gravelly slope alluvium

Gravelly till

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.3 inches

### Additional Components

Redfern and similar soils: 3 percent of the unit

Tigeron and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1641F—Nieman, very stony-Rock outcrop-Libeg, very stony, complex, 45 to 70 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Nieman and similar soils

*Extent:* 45 percent of the map unit

*Geomorphic position:* Escarpments, mountain slopes, ridges

*Slope:* 45 to 70 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.4 inches

### **Rock outcrop**

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock. Boulders and stones make up a small part of the areas.

### **Libeg and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces

*Slope:* 45 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly alluvium

Gravelly colluvium

Gravelly slope alluvium

Gravelly till

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.3 inches

### **Additional Components**

Redfern and similar soils: 4 percent of the unit

Arrowpeak and similar soils: 3 percent of the unit

Surdal and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1642F—Nieman, bouldery-Rock outcrop-Libeg, very bouldery, complex, 25 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Nieman and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, mountain slopes, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.0 inch

#### **Rock outcrop**

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock. Boulders and stones make up a small part of the areas.

#### **Libeg and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces

*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly alluvium

Gravelly colluvium

Gravelly slope alluvium

Gravelly till

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.3 inches

### **Additional Components**

Tigeron and similar soils: 4 percent of the unit

Redfern and similar soils: 3 percent of the unit

Surdal and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1643E—Nieman, stony-Libeg complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Nieman and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Escarpments, mountain slopes, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

#### Libeg and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly alluvium  
 Gravelly colluvium  
 Gravelly slope alluvium  
 Gravelly till  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.7 inches

### Additional Components

Rock outcrop: 4 percent of the unit

Arrowpeak and similar soils: 3 percent of the unit  
 Surdal and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1643F—Nieman, stony-Libeg-Rock outcrop complex, 35 to 60 percent slopes

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Nieman and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, mountain slopes, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

#### Libeg and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly alluvium  
 Gravelly colluvium  
 Gravelly slope alluvium  
 Gravelly till  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.7 inches

**Rock outcrop**

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock. Boulders and stones make up a small part of the areas.

**Additional Components**

Surdal and similar soils: 3 percent of the unit

Worock and similar soils: 3 percent of the unit

Libeg, very bouldery, and similar soils: 2 percent of the unit

Sebud and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1651C—Sawbuck-Sawbuck, very stony-Clasoil complex, 2 to 8 percent slopes****Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

**Component Description****Sawbuck and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, mountain slopes

*Slope:* 2 to 8 percent

*Surface layer texture:* Gravelly loam

*Depth to restrictive feature:* 46 to 60 inches to bedrock (paralithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt over residuum derived from granite

Gravelly colluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.7 inches

**Sawbuck, very stony, and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, mountain slopes

*Slope:* 2 to 8 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Depth to restrictive feature:* 46 to 60 inches to bedrock (paralithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt over residuum derived from granite

Gravelly colluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.7 inches

**Clasoil and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides

*Slope:* 2 to 8 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Fine-loamy alluvium derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 7.9 inches

**Additional Components**

Sawicki and similar soils: 6 percent of the unit

Clasoil, very bouldery, and similar soils: 5 percent of the unit

Breeton and similar soils: 4 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1652E—Sawicki-Clasoil complex, 8 to 35 percent slopes, bouldery****Map Unit Setting**

*Landscape:* Foothills, uplands, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

**Component Description****Sawicki and similar soils**

*Extent:* 55 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, mountain slopes

*Slope:* 8 to 35 percent

*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.1 inches

#### **Clasoil and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Fine-loamy alluvium derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 7.9 inches

#### **Additional Components**

Blaincreek and similar soils: 5 percent of the unit  
 Tolbert and similar soils: 4 percent of the unit  
 Mocmont and similar soils: 3 percent of the unit  
 Rock outcrop: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1654E—Sawicki, stony-Blaincreek-Tolbert, very stony, complex, 15 to 45 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

#### **Component Description**

##### **Sawicki and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, mountain slopes  
*Slope:* 15 to 45 percent

*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.1 inches

#### **Blaincreek and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very cobbly loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly alluvium over residuum derived from basalt  
 Gravelly colluvium over residuum derived from basalt  
 Gravelly residuum derived from basalt  
 Gravelly slope alluvium over residuum derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.6 inches

#### **Tolbert and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, interfluvies, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.3 inches

#### **Additional Components**

Blaincreek, very stony, and similar soils: 6 percent of the unit

Clasoil and similar soils: 5 percent of the unit  
 Rock outcrop: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1655E—Sawicki-Clasoil complex, 8 to 35 percent slopes, bouldery, warm

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

### Component Description

#### Sawicki and similar soils

*Extent:* 55 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, mountain slopes  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from basalt  
     Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.1 inches

#### Clasoil and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Fine-loamy alluvium derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 7.9 inches

### Additional Components

Tolbert and similar soils: 6 percent of the unit

Clasoil soils that have slopes of less than 8 percent: 5 percent of the unit  
 Blaincreek and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1656E—Sawicki-Bielenberg, very stony-Tolbert, very stony, complex, 15 to 45 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

### Component Description

#### Sawicki and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, mountain slopes  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from basalt  
     Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.3 inches

#### Bielenberg and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Hillsides, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Sandy clay loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 40 to 50 inches to bedrock (paralithic); 50 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Fine-loamy colluvium derived from granite over residuum derived from granite  
     Fine-loamy residuum derived from granite  
     Fine-loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.2 inches

#### **Tolbert and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, interfluves, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.3 inches

#### **Additional Components**

Bielenberg and similar soils: 5 percent of the unit  
 Clancy and similar soils: 3 percent of the unit  
 Rock outcrop: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1657E—Sawicki, very bouldery-Crampton, bouldery-Catgulch, bouldery, complex, 15 to 45 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

#### **Component Description**

##### **Sawicki and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, mountain slopes  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very cobbly sandy clay loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Restrictive feature:* None noted

*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.9 inches

##### **Crampton and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, hills, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very cobbly sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*

Gravelly colluvium over sandy and gravelly residuum derived from granite  
 Gravelly residuum derived from granite  
 Gravelly slope alluvium over sandy and gravelly residuum derived from granite

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.5 inches

##### **Catgulch and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Cobbly sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 0.9 inch

#### **Additional Components**

Sawicki soils that do not have boulders on the surface: 5 percent of the unit  
 Burtoner and similar soils: 3 percent of the unit  
 Rock outcrop: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1658D—Sawicki, stony-Blaincreek, very stony, complex, 4 to 15 percent slopes****Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

**Component Description****Sawicki and similar soils**

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, mountain slopes  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.3 inches

**Blaincreek and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly alluvium over residuum derived from basalt  
 Gravelly colluvium over residuum derived from basalt  
 Gravelly residuum derived from basalt  
 Gravelly slope alluvium over residuum derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.4 inches

**Additional Components**

Tolbert and similar soils: 4 percent of the unit  
 Shawmut and similar soils: 3 percent of the unit

Rock outcrop: 2 percent of the unit  
 Rubble land: 1 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1658E—Sawicki, very stony-Blaincreek, very stony-Tolbert, bouldery, complex, 15 to 45 percent slopes****Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

**Component Description****Sawicki and similar soils**

*Extent:* 55 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, mountain slopes  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.3 inches

**Blaincreek and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly alluvium over residuum derived from basalt  
 Gravelly colluvium over residuum derived from basalt  
 Gravelly residuum derived from basalt

Gravelly slope alluvium over residuum derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.4 inches

#### **Tolbert and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, interfluves, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.0 inch

#### **Additional Components**

Hilger and similar soils: 4 percent of the unit

Rock outcrop: 3 percent of the unit

Rubble land: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1659E—Sawbuck, stony-Sawbuck, bouldery, complex, 15 to 35 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Sawbuck, stony, and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, mountain slopes

*Slope:* 15 to 35 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Depth to restrictive feature:* 46 to 60 inches to bedrock (paralithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt over residuum derived from granite

Gravelly colluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.4 inches

#### **Sawbuck, bouldery, and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, mountain slopes

*Slope:* 15 to 35 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Depth to restrictive feature:* 46 to 60 inches to bedrock (paralithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt over residuum derived from granite

Gravelly colluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.4 inches

#### **Additional Components**

Blaincreek and similar soils: 3 percent of the unit

Rock outcrop: 3 percent of the unit

Wickes and similar soils: 3 percent of the unit

Brickner and similar soils: 2 percent of the unit

Gnojek and similar soils: 2 percent of the unit

Shawmut and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1661D—Catgulch-Baxton complex, 2 to 15 percent slopes, stony**

#### **Map Unit Setting**

*Landscape:* Foothills, mountains, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

### Component Description

#### Catgulch and similar soils

*Extent:* 50 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs

*Slope:* 2 to 15 percent

*Surface layer texture:* Gravelly sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

#### Baxton and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Hillsides, mountainsides, ridges

*Slope:* 2 to 15 percent

*Surface layer texture:* Sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Somewhat excessively drained

*Parent material:*

Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium derived from granite over residuum derived from granite

Sandy colluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

### Additional Components

Burtoner and similar soils: 5 percent of the unit

Bielenberg and similar soils: 4 percent of the unit

Breton and similar soils: 3 percent of the unit

Farnuf and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1661E—Catgulch-Baxton complex, 15 to 35 percent slopes, stony

### Map Unit Setting

*Landscape:* Foothills, mountains, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Catgulch and similar soils

*Extent:* 50 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs

*Slope:* 15 to 35 percent

*Surface layer texture:* Gravelly sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

#### Baxton and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Hillsides, mountainsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Somewhat excessively drained

*Parent material:*

Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium derived from granite over residuum derived from granite

Sandy colluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

### Additional Components

Burtoner and similar soils: 6 percent of the unit

Bielenberg and similar soils: 4 percent of the unit

Farnuf and similar soils: 3 percent of the unit  
Clancy and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1662D—Catgulch, very stony-Rock outcrop-Burtoner complex, 4 to 15 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Catgulch and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Gravelly sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 0.9 inch

#### Rock outcrop

*Extent:* 25 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

#### Burtoner and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Sandy loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

- Fine-loamy alluvium over residuum derived from granite
- Fine-loamy colluvium over residuum derived from granite
- Fine-loamy residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

### Additional Components

Baxton and similar soils: 7 percent of the unit  
Connieo and similar soils: 6 percent of the unit  
Ashbray and similar soils: 5 percent of the unit  
Connieo, bouldery, and similar soils: 3 percent of the unit  
Bielenberg and similar soils: 2 percent of the unit  
Crackerville and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1663D—Catgulch, bouldery-Burtoner, bouldery-Rock outcrop complex, 2 to 15 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Catgulch and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Gravelly sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 0.9 inch

**Burtoner and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy alluvium over residuum derived from granite  
 Fine-loamy colluvium over residuum derived from granite  
 Fine-loamy residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.2 inches

**Rock outcrop**

*Extent:* 20 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

**Additional Components**

Baxton and similar soils: 7 percent of the unit  
 Connieo, very bouldery, and similar soils: 6 percent of the unit  
 Breton and similar soils: 4 percent of the unit  
 Connieo and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1664E—Catgulch, bouldery-Rock outcrop-Ashbray, bouldery, complex, 4 to 35 percent slopes****Map Unit Setting**

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

**Component Description****Catgulch and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs  
*Slope:* 4 to 35 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.0 inch

**Rock outcrop**

*Extent:* 25 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

**Ashbray and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 35 percent  
*Surface layer texture:* Gravelly coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:* Sandy and gravelly residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.0 inch

**Additional Components**

Connieo, very bouldery, and similar soils: 3 percent of the unit  
 Shaboom and similar soils: 3 percent of the unit  
 Baxton and similar soils: 2 percent of the unit  
 Connieo and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1665F—Catgulch, very bouldery-Rock outcrop-Connieo, very stony, complex, 35 to 60 percent slopes**

**Map Unit Setting**

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

**Component Description**

**Catgulch and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very cobbly coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 0.8 inch

**Rock outcrop**

*Extent:* 25 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

**Connieo and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very cobbly coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.5 inches

**Additional Components**

Baxton and similar soils: 6 percent of the unit

Kounter and similar soils: 5 percent of the unit  
 Crackerville and similar soils: 4 percent of the unit  
 Breeton and similar soils: 3 percent of the unit  
 Shaboom and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1667E—Catgulch, extremely bouldery-Baxton, extremely bouldery-Burtoner, bouldery, complex, 15 to 35 percent slopes**

**Map Unit Setting**

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

**Component Description**

**Catgulch and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 3 to 15 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.0 inch

**Baxton and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Hillsides, mountainsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 3 to 15 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:* Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium derived from granite over residuum derived from granite  
Sandy colluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.1 inches

#### **Burtoner and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Fine-loamy alluvium over residuum derived from granite  
Fine-loamy colluvium over residuum derived from granite  
Fine-loamy residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.2 inches

#### **Additional Components**

Connieo and similar soils: 6 percent of the unit  
Burtoner soils that have slopes of less than 15 percent: 4 percent of the unit  
Clancy and similar soils: 3 percent of the unit  
Shaboom and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1671E—Tolbert-Blaincreek complex, 8 to 35 percent slopes, warm**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 3,600 to 6,200 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

#### **Component Description**

##### **Tolbert and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, interfluves, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Cobbly loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly residuum derived from basalt  
Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.3 inches

#### **Blaincreek and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 8 to 25 percent  
*Surface layer texture:* Gravelly loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly alluvium over residuum derived from basalt  
Gravelly colluvium over residuum derived from basalt  
Gravelly residuum derived from basalt  
Gravelly slope alluvium over residuum derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.6 inches

#### **Additional Components**

Wickes and similar soils: 10 percent of the unit  
Shawmut and similar soils: 6 percent of the unit  
Rock outcrop: 4 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1672E—Tolbert-Blaincreek complex, 8 to 35 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Tolbert and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, interfluves, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Cobbly loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.3 inches

#### Blaincreek and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 8 to 25 percent  
*Surface layer texture:* Gravelly loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly alluvium over residuum derived from basalt  
 Gravelly colluvium over residuum derived from basalt  
 Gravelly residuum derived from basalt  
 Gravelly slope alluvium over residuum derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.6 inches

### Additional Components

Sawicki and similar soils: 6 percent of the unit  
 Perma and similar soils: 4 percent of the unit  
 Rock outcrop: 3 percent of the unit  
 Wickes and similar soils: 3 percent of the unit  
 Gnojek and similar soils: 2 percent of the unit  
 Rubble land: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 1675E—Tolbert, very stony-Blaincreek, stony-Rock outcrop complex, 8 to 35 percent slopes

#### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Tolbert and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, interfluves, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.0 inch

#### Blaincreek and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly alluvium over residuum derived from basalt  
 Gravelly colluvium over residuum derived from basalt  
 Gravelly residuum derived from basalt  
 Gravelly slope alluvium over residuum derived from basalt  
*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.6 inches

### Rock outcrop

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock. Boulders and stones make up a small part of the areas.

### Additional Components

Sawicki and similar soils: 6 percent of the unit

Gnojek and similar soils: 5 percent of the unit

Wickes and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1675F—Tolbert, very stony-Rock outcrop-Blaincreek, very stony, complex, 35 to 60 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands, mountains

*Elevation:* 4,400 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 105 days

### Component Description

#### Tolbert and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, interfluves, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.0 inch

#### Rock outcrop

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic

extrusive bedrock. Boulders and stones make up a small part of the areas.

### Blaincreek and similar soils

*Extent:* 15 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 35 to 45 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly alluvium over residuum derived from basalt

Gravelly colluvium over residuum derived from basalt

Gravelly residuum derived from basalt

Gravelly slope alluvium over residuum derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.6 inches

### Additional Components

Sawicki and similar soils: 7 percent of the unit

Perma and similar soils: 6 percent of the unit

Brickner and similar soils: 5 percent of the unit

Gnojek and similar soils: 3 percent of the unit

Libeg and similar soils: 2 percent of the unit

Wickes and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1680D—Raynesford silt loam, 4 to 15 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Raynesford and similar soils

*Extent:* 95 percent of the map unit

*Geomorphic position:* Alluvial fans, drainageways, swales

*Slope:* 4 to 15 percent

*Surface layer texture:* Silt loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from limestone

Fine-loamy slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 7.1 inches

### Additional Components

Hanson and similar soils: 3 percent of the unit

Raynesford soils that have slopes of more than 25 percent: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1690F—Cheadle, very stony-Rock outcrop-Tiban, bouldery, complex, 15 to 45 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Cheadle and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, mountain slopes, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.4 inches

#### Rock outcrop

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of exposed

areas of hard sedimentary and metamorphic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

### Tiban and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 15 to 45 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.0 inches

### Additional Components

Kimpton and similar soils: 6 percent of the unit

Monaberg and similar soils: 5 percent of the unit

Ratiopeak and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1721C—Martinsdale loam, 2 to 8 percent slopes, warm

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

### Component Description

#### Martinsdale and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 2 to 8 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, fine-loamy alluvium derived from granite

Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.2 inches

### Additional Components

Judell and similar soils: 3 percent of the unit

Martinsdale, cobbly, and similar soils: 3 percent of the unit

Shawmut and similar soils: 2 percent of the unit

Windham and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1722C—Martinsdale-Martinsdale, stony-Shawmut complex, 2 to 8 percent slopes, warm

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

### Component Description

#### Martinsdale and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 2 to 8 percent

*Surface layer texture:* Cobbly sandy clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, fine-loamy alluvium derived from granite

Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.1 inches

#### Martinsdale, stony, and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 2 to 8 percent

*Surface layer texture:* Sandy clay loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, fine-loamy alluvium derived from granite

Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.2 inches

#### Shawmut and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides

*Slope:* 2 to 8 percent

*Surface layer texture:* Cobbly sandy clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.1 inches

### Additional Components

Martinsdale, cobbly, and similar soils: 7 percent of the unit

Shawmut, stony, and similar soils: 6 percent of the unit

Judell and similar soils: 5 percent of the unit

Windham and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1722E—Martinsdale-Martinsdale, stony-Shawmut complex, 15 to 35 percent slopes, warm

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,200 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

## Component Description

### Martinsdale and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 15 to 35 percent

*Surface layer texture:* Cobbly sandy clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, fine-loamy alluvium derived from granite

Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.1 inches

### Martinsdale, stony, and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 15 to 35 percent

*Surface layer texture:* Sandy clay loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, fine-loamy alluvium derived from granite

Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.2 inches

### Shawmut and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides

*Slope:* 15 to 35 percent

*Surface layer texture:* Cobbly sandy clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.1 inches

## Additional Components

Absarook and similar soils: 2 percent of the unit

Judell and similar soils: 2 percent of the unit

Martinsdale soils that have slopes of less than 15 percent: 2 percent of the unit

Shawmut, stony, and similar soils: 2 percent of the unit

Windham and similar soils: 2 percent of the unit

## Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1723D—Martinsdale-Shawmut complex, 2 to 15 percent slopes, bouldery, warm

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

## Component Description

### Martinsdale and similar soils

*Extent:* 60 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 2 to 15 percent

*Surface layer texture:* Sandy clay loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, fine-loamy alluvium derived from granite

Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.2 inches

### Shawmut and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides

*Slope:* 2 to 15 percent

*Surface layer texture:* Gravelly sandy clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.4 inches

### Additional Components

Martinsdale, stony, and similar soils: 5 percent of the unit  
 Shawmut soils that have slopes of more than 15 percent: 4 percent of the unit  
 Martinsdale soils that are not bouldery: 3 percent of the unit  
 Shawmut soils that are not bouldery: 2 percent of the unit  
 Judell and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1724D—Martinsdale-Shawmut, stony-Martinsdale, bouldery, complex, 4 to 25 percent slopes, warm

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,200 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

### Component Description

#### Martinsdale and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Cobbly clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Calcareous, fine-loamy alluvium derived from granite  
 Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Flooding:* None

*Available water capacity:* Mainly 8.0 inches

#### Shawmut and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides  
*Slope:* 4 to 25 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.6 inches

#### Martinsdale, bouldery, and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 4 to 25 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Calcareous, fine-loamy alluvium derived from granite  
 Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.2 inches

### Additional Components

Absarook and similar soils: 6 percent of the unit  
 Judell and similar soils: 5 percent of the unit  
 Windham and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1731E—Tepecreek, bouldery-Caseypeak, very bouldery-Rock outcrop complex, 8 to 35 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Tepecreek and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, mountain slopes, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium over residuum derived from granite  
     Gravelly slope alluvium over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 2.7 inches

#### Caseypeak and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Mountainsides, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Very cobbly coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Loamy and gravelly slope alluvium over residuum derived from granite  
     Sandy and gravelly residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.0 inch

#### Rock outcrop

*Extent:* 8 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock.

### Additional Components

Rubble land: 7 percent of the unit  
 Bobovic and similar soils: 3 percent of the unit  
 Worock and similar soils: 3 percent of the unit

Elve and similar soils: 2 percent of the unit  
 Franconi and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1731F—Tepecreek, very bouldery-Caseypeak, rubbly-Rock outcrop complex, 35 to 60 percent slopes

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Tepecreek and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, mountain slopes, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Cobbly coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium over residuum derived from granite  
     Gravelly slope alluvium over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 2.4 inches

#### Caseypeak and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Mountainsides, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very stony coarse sandy loam  
*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Loamy and gravelly slope alluvium over residuum derived from granite  
     Sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.0 inch

### **Rock outcrop**

*Extent:* 9 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock.

### **Additional Components**

Rubble land: 9 percent of the unit

Bobowic and similar soils: 4 percent of the unit

Worock and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1732F—Tepecreek, very bouldery-Caseypeak, very bouldery-Rock outcrop complex, 35 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 8,000 feet

*Mean annual precipitation:* 15 to 30 inches

*Frost-free period:* 30 to 70 days

### **Component Description**

#### **Tepecreek and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Escarpments, mountain slopes, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Cobbly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from granite

Gravelly slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.4 inches

#### **Caseypeak and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Mountainsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Very cobbly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Loamy and gravelly slope alluvium over residuum derived from granite

Sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.0 inch

### **Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock.

### **Additional Components**

Rubble land: 10 percent of the unit

Bobowic and similar soils: 6 percent of the unit

Rubick and similar soils: 5 percent of the unit

Kurrie and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1734F—Hiore, stony-Kurrie, stony-Caseypeak, very stony, complex, 35 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Hiore and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Mountain slopes, mountain valleys

*Slope:* 35 to 60 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Sandy and gravelly residuum derived from granite

Sandy and gravelly slope alluvium derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.3 inches

#### **Kurrie and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Cobbly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Depth to restrictive feature:* 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from granite

Gravelly slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.9 inches

#### **Caseypeak and similar soils**

*Extent:* 10 percent of the map unit

*Geomorphic position:* Mountainsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Very cobbly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Loamy and gravelly slope alluvium over residuum derived from granite

Sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.0 inch

#### **Additional Components**

Hiore soils that have slopes of less than 35 percent: 6 percent of the unit

Hiore, cool, and similar soils: 5 percent of the unit

Rock outcrop: 4 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1735E—Tepecreek, stony-Caseypeak, very bouldery-Rock outcrop complex, 15 to 35 percent slopes**

#### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 8,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

#### **Component Description**

##### **Tepecreek and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Escarpments, mountain slopes, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Gravelly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from granite

Gravelly slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.5 inches

##### **Caseypeak and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Mountainsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Very gravelly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Loamy and gravelly slope alluvium over residuum derived from granite

Sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.0 inch

### **Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### **Additional Components**

Branham and similar soils: 5 percent of the unit

Tepecreek soils that have slopes of more than 35 percent: 5 percent of the unit

Tuggle and similar soils: 5 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1735F—Tepecreek, stony-Caseypeak, very stony-Rock outcrop complex, 35 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 8,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Tepecreek and similar soils**

*Extent:* 55 percent of the map unit

*Geomorphic position:* Escarpments, mountain slopes, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Gravelly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from granite

Gravelly slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.5 inches

### **Caseypeak and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Mountainsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Cobbly loamy coarse sand

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Loamy and gravelly slope alluvium over residuum derived from granite

Sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.1 inches

### **Rock outcrop**

*Extent:* 10 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### **Additional Components**

Tepecreek soils that have slopes of less than 35 percent: 10 percent of the unit

Tuggle and similar soils: 5 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1740E—Tropal, bouldery-Hanson, stony-Rock outcrop complex, 8 to 25 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Tropal and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 8 to 25 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 0.9 inch

#### Hanson and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, ridges  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from limestone  
 Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.5 inches

#### Rock outcrop

*Extent:* 20 percent of the map unit  
*Definition:* This component consists mainly of areas of exposed hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

### Additional Components

Tropal, very stony, and similar soils: 6 percent of the unit  
 Firada and similar soils: 5 percent of the unit  
 Whitore and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 1741F—Tropal, bouldery-Rock outcrop-Whitore, bouldery, complex, 15 to 45 percent slopes

#### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Tropal and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 0.9 inch

#### Rock outcrop

*Extent:* 25 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

#### Whitore and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from limestone  
 Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 4.0 inches

### Additional Components

Firada and similar soils: 6 percent of the unit  
Hanson and similar soils: 5 percent of the unit  
Helmville and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 1742F—Tropal, very bouldery-Rock outcrop complex, 25 to 60 percent slopes

#### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

#### Component Description

##### Tropal and similar soils

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 0.9 inch

##### Rock outcrop

*Extent:* 30 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

### Additional Components

Hanson and similar soils: 4 percent of the unit  
Firada and similar soils: 3 percent of the unit  
Whitore and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 1750F—Whitore, bouldery-Tropal, very bouldery-Rock outcrop complex, 25 to 45 percent slopes

#### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

#### Component Description

##### Whitore and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 25 to 45 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly colluvium derived from limestone  
Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 4.0 inches

##### Tropal and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 25 to 45 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 0.9 inch

##### Rock outcrop

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

### **Additional Components**

Firada and similar soils: 6 percent of the unit  
Helmville and similar soils: 5 percent of the unit  
Hanson and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1751F—Whitore, very stony-Tropal, very bouldery-Rock outcrop complex, 15 to 45 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Whitore and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly colluvium derived from limestone  
Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 5.5 inches

#### **Tropal and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from limestone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

### **Rock outcrop**

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

### **Additional Components**

Firada and similar soils: 6 percent of the unit  
Helmville and similar soils: 5 percent of the unit  
Hanson and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1752E—Whitore, stony-Helmville, bouldery-Firada, very stony, complex, 15 to 45 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Whitore and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly colluvium derived from limestone  
Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 5.3 inches

#### **Helmville and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Mountain slopes, mountain valleys  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from argillaceous limestone  
 Gravelly slope alluvium derived from argillaceous limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 5.6 inches

#### **Firada and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium over gravelly residuum derived from limestone  
 Gravelly residuum derived from limestone  
 Gravelly slope alluvium over gravelly residuum derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.1 inches

#### **Additional Components**

Tropal and similar soils: 6 percent of the unit  
 Rock outcrop: 5 percent of the unit  
 Hanson and similar soils: 4 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1753E—Whitore, stony-Tropal, very stony-Firada, very stony, complex, 8 to 35 percent slopes**

#### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

#### **Component Description**

##### **Whitore and similar soils**

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from limestone  
 Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 5.3 inches

##### **Tropal and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 0.9 inch

##### **Firada and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium over gravelly residuum derived from limestone  
 Gravelly residuum derived from limestone  
 Gravelly slope alluvium over gravelly residuum derived from limestone  
*Native plant cover type:* Forest land

*Flooding:* None

*Sodicity:* Sodic within a depth of 30 inches

*Available water capacity:* Mainly 3.1 inches

### **Additional Components**

Helmville and similar soils: 4 percent of the unit

Hanson and similar soils: 3 percent of the unit

Rock outcrop: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1760E—Hanson, stony-Whitore, bouldery, complex, 8 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Hanson and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from limestone

Gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.5 inches

#### **Whitore and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 8 to 35 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from limestone

Gravelly slope alluvium derived from limestone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.0 inches

### **Additional Components**

Tropal and similar soils: 10 percent of the unit

Rock outcrop: 4 percent of the unit

Firada and similar soils: 3 percent of the unit

Helmville and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1770E—Helmville, rubbly-Tiban, very bouldery-Rock outcrop complex, 15 to 45 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Helmville and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Mountain slopes, mountain valleys

*Slope:* 15 to 45 percent

*Surface layer texture:* Stony loam

*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from argillaceous limestone

Gravelly slope alluvium derived from argillaceous limestone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 6.5 inches

#### **Tiban and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 15 to 45 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

- Gravelly colluvium derived from basalt
- Gravelly colluvium derived from metavolcanics
- Gravelly slope alluvium derived from basalt
- Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.7 inches

### **Rock outcrop**

*Extent:* 10 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

### **Additional Components**

- Rubble land: 10 percent of the unit
- Kimpton and similar soils: 3 percent of the unit
- Redfern and similar soils: 3 percent of the unit
- Cheadle and similar soils: 2 percent of the unit
- Nieman and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1781E—Firada, stony-Tropal, very stony-Rock outcrop complex, 4 to 25 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Firada and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Mountain slopes, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

- Gravelly colluvium over gravelly residuum derived from limestone
- Gravelly residuum derived from limestone

Gravelly slope alluvium over gravelly residuum derived from limestone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

### **Tropal and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Mountain slopes, ridges

*Slope:* 4 to 25 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from limestone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

### **Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

### **Additional Components**

- Hanson and similar soils: 6 percent of the unit
- Whitore and similar soils: 5 percent of the unit
- Tiban and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1790F—Sigbird, very bouldery-Sigbird, stony-Rock outcrop complex, 25 to 70 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Sigbird, very bouldery, and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, mountain slopes, ridges

*Slope:* 35 to 70 percent  
*Surface layer texture:* Very channery loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
 Gravelly residuum derived from claystone  
 Gravelly slope alluvium derived from hard shale over residuum derived from hard shale  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.3 inches

### **Sigbird, stony, and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, mountain slopes, ridges  
*Slope:* 25 to 50 percent  
*Surface layer texture:* Channery loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
 Gravelly residuum derived from claystone  
 Gravelly slope alluvium derived from hard shale over residuum derived from hard shale  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.4 inches

### **Rock outcrop**

*Extent:* 20 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, fractured shale bedrock. Flagstones litter the areas and accumulate at the base of hills and escarpments.

### **Additional Components**

Hanson and similar soils: 4 percent of the unit  
 Cheadle and similar soils: 3 percent of the unit  
 Kimpton and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1800D—Breeton coarse sandy loam, 4 to 15 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Breeton and similar soils**

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Coarse-loamy alluvium derived from granite  
 Coarse-loamy colluvium derived from granite  
 Coarse-loamy slope alluvium derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 6.4 inches

### **Additional Components**

Baxton and similar soils: 6 percent of the unit  
 Connieo and similar soils: 4 percent of the unit  
 Burtoner and similar soils: 3 percent of the unit  
 Catgulch and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1802D—Breeton-Baxton-Connieo complex, 4 to 15 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

### **Component Description**

#### **Breeton and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 4 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Coarse-loamy alluvium derived from granite  
 Coarse-loamy colluvium derived from granite  
 Coarse-loamy slope alluvium derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 6.4 inches

#### **Baxton and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Hillsides, mountainsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Sandy loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
 Coarse-loamy residuum derived from granite  
 Coarse-loamy slope alluvium derived from granite over residuum derived from granite  
 Sandy colluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.1 inches

#### **Connieo and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.9 inches

#### **Additional Components**

Baxton, bouldery, and similar soils: 6 percent of the unit  
 Rock outcrop: 4 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1803C—Breeton-Cometcrik complex, 2 to 8 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, mountains, river valleys, valleys, uplands  
*Elevation:* 3,940 to 6,000 feet  
*Mean annual precipitation:* 12 to 22 inches  
*Frost-free period:* 80 to 105 days

#### **Component Description**

##### **Breeton and similar soils**

*Extent:* 65 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 4 to 8 percent  
*Surface layer texture:* Coarse sandy loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Coarse-loamy alluvium derived from granite  
 Coarse-loamy colluvium derived from granite  
 Coarse-loamy slope alluvium derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 6.4 inches

##### **Cometcrik and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 2 to 4 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Poorly drained  
*Parent material:* Fine-loamy alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Frequent  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 9.4 inches

#### **Additional Components**

Eagleton and similar soils: 4 percent of the unit  
 Kokoruda and similar soils: 4 percent of the unit  
 Faith and similar soils: 3 percent of the unit  
 Wetsand and similar soils: 3 percent of the unit  
 Perma and similar soils: 1 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1810F—Hoyt, very stony-Ymark,  
bouldery-Shaboom, very bouldery,  
complex, 25 to 60 percent slopes**

**Map Unit Setting**

*Landscape:* Foothills, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

**Component Description**

**Hoyt and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Sandy clay loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
Fine-loamy colluvium derived from basalt  
Fine-loamy slope alluvium derived from basalt  
Fine-loamy till

*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 9.0 inches

**Ymark and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, mountain slopes, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Gravelly sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly colluvium derived from granite and fine grained igneous rock over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.9 inches

**Shaboom and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Cobbly sandy clay loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from granite  
Gravelly slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

**Additional Components**

Lumpgulch and similar soils: 5 percent of the unit  
Breeton and similar soils: 4 percent of the unit  
Rock outcrop: 3 percent of the unit  
Repkie and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1821F—Kellygulch, bouldery-Rock  
outcrop-Bielenberg complex, 35 to 70  
percent slopes**

**Map Unit Setting**

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

**Component Description**

**Kellygulch and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Coarse-loamy colluvium over residuum derived from granite  
Coarse-loamy residuum derived from granite  
Coarse-loamy slope alluvium over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.1 inches

**Rock outcrop**

*Extent:* 30 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

**Bielenberg and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Hillsides, ridges

*Slope:* 35 to 70 percent

*Surface layer texture:* Loam

*Depth to restrictive feature:* 40 to 50 inches to bedrock (paralithic); 50 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from granite over residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.7 inches

**Additional Components**

Elmark and similar soils: 4 percent of the unit

Baxton and similar soils: 2 percent of the unit

Lumpgulch and similar soils: 2 percent of the unit

Shaboom and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1822F—Kellygulch, stony-Shaboom, very bouldery-Rock outcrop association, 45 to 75 percent slopes****Map Unit Setting**

*Landscape:* Foothills, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

**Component Description****Kellygulch and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 45 to 75 percent

*Surface layer texture:* Gravelly sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy colluvium over residuum derived from granite

Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.9 inches

**Shaboom and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 45 to 75 percent

*Surface layer texture:* Cobbly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from granite

Gravelly slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.1 inches

**Rock outcrop**

*Extent:* 10 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock.

**Additional Components**

Rubble land: 10 percent of the unit

Baxton, moist, and similar soils: 5 percent of the unit

Baxton soils that have slopes of less than 35 percent: 5 percent of the unit

Shaboom, extremely bouldery, and similar soils: 5 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1823E—Kellygulch, stony-Shaboom, very bouldery-Rock outcrop complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Kellygulch and similar soils

*Extent:* 60 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy colluvium over residuum derived from granite

Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

#### Shaboom and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from granite

Gravelly slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

#### Rock outcrop

*Extent:* 10 percent of the map unit

*Definition:* This component consists mainly of exposed

areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Baxton and similar soils: 5 percent of the unit

Breeton and similar soils: 3 percent of the unit

Kellygulch soils that have slopes of more than 35 percent: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1823F—Kellygulch, stony-Shaboom, very bouldery-Rock outcrop complex, 35 to 60 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Kellygulch and similar soils

*Extent:* 60 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy colluvium over residuum derived from granite

Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

#### Shaboom and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from granite

Gravelly slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

### **Rock outcrop**

*Extent:* 10 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### **Additional Components**

Baxton and similar soils: 5 percent of the unit  
Kellygulch soils that have slopes of less than 35 percent: 5 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1830E—Clancy-Bielenberg-Breton complex, 15 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Clancy and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Escarpments, hills, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Sandy loam

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:* Fine-loamy colluvium derived from

granite over sandy and gravelly residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.8 inches

### **Bielenberg and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Loam

*Depth to restrictive feature:* 40 to 50 inches to bedrock (paralithic); 50 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from granite over residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.7 inches

### **Breton and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 15 to 35 percent

*Surface layer texture:* Coarse sandy loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy alluvium derived from granite

Coarse-loamy colluvium derived from granite

Coarse-loamy slope alluvium derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.4 inches

### **Additional Components**

Catgulch and similar soils: 6 percent of the unit

Connieo and similar soils: 5 percent of the unit

Burtoner and similar soils: 4 percent of the unit

Shaboom and similar soils: 4 percent of the unit

Kellygulch and similar soils: 3 percent of the unit

Rock outcrop: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1831D—Clancy-Burtoner, bouldery, complex, 4 to 15 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 95 days

### Component Description

#### Clancy and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Escarpments, hills, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Fine-loamy colluvium derived from granite over sandy and gravelly residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.8 inches

#### Burtoner and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Fine-loamy alluvium over residuum derived from granite  
     Fine-loamy colluvium over residuum derived from granite  
     Fine-loamy residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.2 inches

### Additional Components

Farnuf and similar soils: 4 percent of the unit  
 Catgulch and similar soils: 3 percent of the unit  
 Martinsdale and similar soils: 3 percent of the unit  
 Baxton and similar soils: 2 percent of the unit  
 Placerton and similar soils: 2 percent of the unit  
 Hapgood and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1832D—Clancy-Burtoner, bouldery-Rock outcrop complex, 4 to 15 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Clancy and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Escarpments, hills, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Fine-loamy colluvium derived from granite over sandy and gravelly residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.8 inches

#### Burtoner and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Fine-loamy alluvium over residuum derived from granite  
     Fine-loamy colluvium over residuum derived from granite  
     Fine-loamy residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.2 inches

**Rock outcrop**

*Extent:* 10 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

**Additional Components**

Farnuf and similar soils: 6 percent of the unit  
Martinsdale and similar soils: 5 percent of the unit  
Catgulch and similar soils: 4 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1833D—Clancy-Connieo complex, 2 to 15 percent slopes****Map Unit Setting**

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

**Component Description****Clancy and similar soils**

*Extent:* 70 percent of the map unit  
*Geomorphic position:* Escarpments, hills, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Fine-loamy colluvium derived from granite over sandy and gravelly residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.3 inches

**Connieo and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

**Additional Components**

Placerton and similar soils: 6 percent of the unit  
Bielenberg and similar soils: 4 percent of the unit  
Crackerville and similar soils: 3 percent of the unit  
Martinsdale and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1835D—Clancy-Bielenberg-Connieo complex, 4 to 15 percent slopes****Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

**Component Description****Clancy and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Escarpments, hills, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Sandy clay loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Fine-loamy colluvium derived from granite over sandy and gravelly residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.2 inches

**Bielenberg and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Hillsides, ridges  
*Slope:* 4 to 8 percent  
*Surface layer texture:* Sandy clay loam  
*Depth to restrictive feature:* 40 to 50 inches to bedrock (paralithic); 50 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from granite over residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.7 inches

**Connieo and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Gravelly sandy clay loam

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

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.1 inches

**Additional Components**

Burtoner and similar soils: 5 percent of the unit

Connieo soils that have slopes of more than 15 percent: 3 percent of the unit

Rock outcrop: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1836E—Clancy, bouldery-Bielenberg, stony-Catgulch, bouldery, complex, 15 to 45 percent slopes****Map Unit Setting**

*Landscape:* Foothills, uplands, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

**Component Description****Clancy and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Escarpments, hills, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Gravelly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:* Fine-loamy colluvium derived from granite over sandy and gravelly residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.5 inches

**Bielenberg and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Sandy clay loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Depth to restrictive feature:* 40 to 50 inches to bedrock (paralithic); 50 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from granite over residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.2 inches

**Catgulch and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs

*Slope:* 15 to 45 percent

*Surface layer texture:* Cobbly sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

**Additional Components**

Burtoner and similar soils: 4 percent of the unit

Crampton and similar soils: 4 percent of the unit

Placerton and similar soils: 3 percent of the unit

Bielenberg soils that have slopes of less than 15 percent: 2 percent of the unit

Rock outcrop: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1837E—Clancy-Bielenberg-Connieo complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

### Component Description

#### Clancy and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Escarpments, hills, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Sandy clay loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Fine-loamy colluvium derived from granite over sandy and gravelly residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.2 inches

#### Bielenberg and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Sandy clay loam  
*Depth to restrictive feature:* 40 to 50 inches to bedrock (paralithic); 50 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium derived from granite over residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.7 inches

#### Connieo and similar soils

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Gravelly sandy clay loam

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

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.1 inches

### Additional Components

Burtoner and similar soils: 4 percent of the unit

Baxton and similar soils: 3 percent of the unit

Farnuf and similar soils: 2 percent of the unit

Rock outcrop: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1838D—Clancy-Clancy, very stony-Bielenberg complex, 4 to 15 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

### Component Description

#### Clancy and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hills, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Sandy clay loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Fine-loamy colluvium derived from granite over sandy and gravelly residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.2 inches

#### Clancy, very stony, and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hills, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained  
*Parent material:* Fine-loamy colluvium derived from granite over sandy and gravelly residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.8 inches

#### **Bielenberg and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Sandy clay loam  
*Depth to restrictive feature:* 40 to 50 inches to bedrock (paralithic); 50 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium derived from granite over residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.7 inches

#### **Additional Components**

Burtoner and similar soils: 5 percent of the unit  
 Connieo and similar soils: 5 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1841D—Tuggle-Branham-Rock outcrop complex, 2 to 15 percent slopes**

#### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

#### **Component Description**

##### **Tuggle and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Escarpments, mountain slopes, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)

*Drainage class:* Well drained  
*Parent material:*  
 Loamy residuum derived from granite  
 Loamy slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.7 inches

#### **Branham and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Sandy loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Sandy and gravelly residuum derived from granite  
 Sandy and gravelly colluvium over residuum derived from granite  
 Coarse-loamy slope alluvium over residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.9 inches

#### **Rock outcrop**

*Extent:* 20 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

#### **Additional Components**

Opitz and similar soils: 6 percent of the unit  
 Branham, moist, and similar soils: 5 percent of the unit  
 Caseypeak and similar soils: 4 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1842D—Caseypeak-Branham-Rock outcrop complex, 2 to 15 percent slopes**

#### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

## Component Description

### Caseypeak and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Mountainsides, ridges

*Slope:* 2 to 15 percent

*Surface layer texture:* Sandy loam

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

*Drainage class:* Well drained

*Parent material:*

Loamy and gravelly slope alluvium over residuum derived from granite

Sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

### Branham and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Mountain slopes, ridges

*Slope:* 2 to 15 percent

*Surface layer texture:* Sandy loam

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

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly residuum derived from granite

Sandy and gravelly colluvium over residuum derived from granite

Coarse-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

### Rock outcrop

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

## Additional Components

Bobowic and similar soils: 5 percent of the unit

Clugulch and similar soils: 4 percent of the unit

Branham, moist, and similar soils: 3 percent of the unit

Lowder and similar soils: 3 percent of the unit

## Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1842E—Caseypeak-Branham-Rock outcrop complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

## Component Description

### Caseypeak and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Mountainsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Sandy loam

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

*Drainage class:* Well drained

*Parent material:*

Loamy and gravelly slope alluvium over residuum derived from granite

Sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

### Branham and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Mountain slopes, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Sandy loam

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

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly residuum derived from granite

Sandy and gravelly colluvium over residuum derived from granite

Coarse-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

### Rock outcrop

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### **Additional Components**

Bobowic and similar soils: 5 percent of the unit  
Clugulch and similar soils: 4 percent of the unit  
Tepecreek and similar soils: 3 percent of the unit  
Branham, moist, and similar soils: 2 percent of the unit  
Lowder and similar soils: 1 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1842F—Caseypeak, bouldery-Branham, bouldery-Rock outcrop complex, 35 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 40 to 70 days

### **Component Description**

#### **Caseypeak and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Mountainsides, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Loamy and gravelly slope alluvium over residuum derived from granite  
Sandy and gravelly residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.3 inches

#### **Branham and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly residuum derived from granite  
Sandy and gravelly colluvium over residuum derived from granite  
Coarse-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

### **Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### **Additional Components**

Clugulch and similar soils: 5 percent of the unit  
Bobowic and similar soils: 4 percent of the unit  
Tepecreek and similar soils: 3 percent of the unit  
Branham loam and similar soils: 2 percent of the unit  
Lowder and similar soils: 1 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1851D—Branham-Lowder loams, 0 to 8 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Branham and similar soils**

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 0 to 8 percent  
*Surface layer texture:* Loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium derived from granite  
over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.2 inches

#### **Lowder and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Alluvial fans, drainageways,  
flood plains, flood-plain steps  
*Slope:* 0 to 8 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Very poorly drained  
*Parent material:* Fine-loamy over sandy and gravelly  
recent alluvium derived from mixed igneous,  
sedimentary, and metamorphic rocks  
*Native plant cover type:* Forest land  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 5.2 inches

#### **Additional Components**

Branham, very bouldery, and similar soils: 6 percent of  
the unit  
Opitz and similar soils: 5 percent of the unit  
Clugulch and similar soils: 4 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1851E—Branham-Lowder loams, 8 to 25 percent slopes**

#### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

#### **Component Description**

##### **Branham and similar soils**

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 8 to 25 percent  
*Surface layer texture:* Loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock  
(lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium derived from granite  
over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.2 inches

#### **Lowder and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Alluvial fans, drainageways,  
flood plains, flood-plain steps  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Very poorly drained  
*Parent material:* Fine-loamy over sandy and gravelly  
recent alluvium derived from mixed igneous,  
sedimentary, and metamorphic rocks  
*Native plant cover type:* Forest land  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 5.2 inches

#### **Additional Components**

Branham, very bouldery, and similar soils: 6 percent of  
the unit  
Opitz and similar soils: 5 percent of the unit  
Clugulch and similar soils: 4 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1853D—Branham-Tuggle complex, 2 to 15 percent slopes**

#### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

#### **Component Description**

##### **Branham and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Sandy loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock  
(lithic)  
*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly residuum derived from granite  
 Sandy and gravelly colluvium over residuum derived from granite  
 Coarse-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 1.9 inches**Tuggle and similar soils***Extent:* 35 percent of the map unit*Geomorphic position:* Escarpments, mountain slopes, ridges*Slope:* 2 to 15 percent*Surface layer texture:* Coarse sandy loam*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)*Drainage class:* Well drained*Parent material:*

Loamy residuum derived from granite  
 Loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 1.7 inches**Additional Components**

Opitz and similar soils: 5 percent of the unit

Clugulch and similar soils: 4 percent of the unit

Branham loam and similar soils: 3 percent of the unit

Lowder and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1853E—Branham-Tuggle complex, 15 to 35 percent slopes****Map Unit Setting***Landscape:* Mountains*Elevation:* 5,500 to 7,500 feet*Mean annual precipitation:* 15 to 24 inches*Frost-free period:* 50 to 70 days**Component Description****Branham and similar soils***Extent:* 60 percent of the map unit*Geomorphic position:* Mountain slopes, ridges*Slope:* 15 to 35 percent*Surface layer texture:* Loam*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)*Drainage class:* Well drained*Parent material:*

Sandy and gravelly residuum derived from granite  
 Sandy and gravelly colluvium over residuum derived from granite  
 Coarse-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 2.4 inches**Tuggle and similar soils***Extent:* 25 percent of the map unit*Geomorphic position:* Escarpments, mountain slopes, ridges*Slope:* 15 to 35 percent*Surface layer texture:* Coarse sandy loam*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)*Drainage class:* Well drained*Parent material:*

Loamy residuum derived from granite  
 Loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 1.7 inches**Additional Components**

Opitz and similar soils: 5 percent of the unit

Hiore and similar soils: 4 percent of the unit

Branham, moist, and similar soils: 3 percent of the unit

Clugulch and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1861F—Clugulch-Bobowic-Rock outcrop complex, 35 to 70 percent slopes****Map Unit Setting***Landscape:* Mountains, foothills*Elevation:* 4,400 to 7,500 feet*Mean annual precipitation:* 15 to 24 inches*Frost-free period:* 40 to 95 days

### Component Description

#### Clugulch and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Mountainsides, ridges  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Sandy loam  
*Depth to restrictive feature:* 4 to 10 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 0.7 inch

#### Bobowic and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Sandy loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Sandy and gravelly alluvium over residuum derived from granite  
     Sandy and gravelly colluvium over residuum derived from granite  
     Sandy and gravelly residuum derived from granite  
     Sandy and gravelly slope alluvium over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 2.2 inches

#### Rock outcrop

*Extent:* 25 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Caseypeak and similar soils: 6 percent of the unit  
 Elmark and similar soils: 5 percent of the unit  
 Lumpgulch and similar soils: 5 percent of the unit  
 Hiore and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 1871E—Hiore, stony-Rock outcrop complex, 15 to 35 percent slopes

#### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Hiore and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Mountain slopes, mountain valleys  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
     Sandy and gravelly residuum derived from granite  
     Sandy and gravelly slope alluvium derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.3 inches

#### Rock outcrop

*Extent:* 35 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Bobowic and similar soils: 5 percent of the unit  
 Tepecreek and similar soils: 4 percent of the unit  
 Branham and similar soils: 3 percent of the unit  
 Kurrie and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 1871F—Hiore, stony-Rock outcrop complex, 35 to 70 percent slopes

#### Map Unit Setting

*Landscape:* Mountains, foothills  
*Elevation:* 4,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 95 days

### Component Description

#### Hiore and similar soils

*Extent:* 50 percent of the map unit

*Geomorphic position:* Mountain slopes, mountain valleys

*Slope:* 35 to 70 percent

*Surface layer texture:* Sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Sandy and gravelly residuum derived from granite

Sandy and gravelly slope alluvium derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.3 inches

#### Rock outcrop

*Extent:* 35 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Bobowic and similar soils: 5 percent of the unit

Kellygulch and similar soils: 4 percent of the unit

Caseypeak and similar soils: 3 percent of the unit

Kurrie and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1872E—Hiore-Clugulch-Rock outcrop complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Hiore and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Mountain slopes, mountain valleys

*Slope:* 15 to 35 percent

*Surface layer texture:* Sandy loam

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Sandy and gravelly residuum derived from granite

Sandy and gravelly slope alluvium derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.3 inches

#### Clugulch and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Mountainsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Sandy loam

*Depth to restrictive feature:* 4 to 10 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 0.7 inch

#### Rock outcrop

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Branham and similar soils: 5 percent of the unit

Clugulch soils that have slopes of more than 35 percent: 5 percent of the unit

Tepecreek and similar soils: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1872F—Hiore-Clugulch-Rock outcrop complex, 35 to 70 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Hiore and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Mountain slopes, mountain valleys

*Slope:* 35 to 70 percent

*Surface layer texture:* Sandy loam

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Sandy and gravelly residuum derived from granite

Sandy and gravelly slope alluvium derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.3 inches

#### Clugulch and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Mountainsides, ridges

*Slope:* 35 to 70 percent

*Surface layer texture:* Sandy loam

*Depth to restrictive feature:* 4 to 10 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 0.7 inch

#### Rock outcrop

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Caseypeak and similar soils: 5 percent of the unit  
Hiore soils that have slopes of less than 35 percent: 5 percent of the unit

Tepecreek and similar soils: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1901F—Warwood-Tigeron, very stony-Cowood, very stony, complex, 25 to 60 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Warwood and similar soils

*Extent:* 45 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 25 to 60 percent

*Surface layer texture:* Gravelly sandy clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 8.1 inches

#### Tigeron and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, ridges, saddles

*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.0 inches

#### Cowood and similar soils

*Extent:* 15 percent of the map unit

*Geomorphic position:* Escarpments, mountainsides, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Extremely cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from sandstone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 0.9 inch

### Additional Components

Rock outcrop: 7 percent of the unit  
 Tigeron, bouldery, and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1902D—Warwood, very bouldery-Warwood, very stony-Tigeron, very bouldery, complex, 2 to 15 percent slopes

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Warwood, very bouldery, and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium derived from granite

*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 7.6 inches

#### Warwood, very stony, and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 7.6 inches

#### Tigeron and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, ridges, saddles  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 5.0 inches

### Additional Components

Redfern and similar soils: 7 percent of the unit  
 Tigeron soils that have slopes of more than 15 percent: 5 percent of the unit  
 Ellena and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1910F—Elmark, very bouldery-Rock outcrop-Shaboom, extremely bouldery, complex, 25 to 60 percent slopes**

#### **Map Unit Setting**

*Landscape:* Mountains, foothills  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

#### **Component Description**

##### **Elmark and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, mountainsides, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium over sandy and gravelly residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium over sandy and gravelly residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.6 inches

##### **Rock outcrop**

*Extent:* 35 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

##### **Shaboom and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 3 to 15 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from granite

Gravelly slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

#### **Additional Components**

Ashbray and similar soils: 4 percent of the unit  
 Breton and similar soils: 3 percent of the unit  
 Kellygulch and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **1921D—Judell-Lap, very stony, complex, 4 to 15 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands  
*Elevation:* 4,000 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

#### **Component Description**

##### **Judell and similar soils**

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium derived from limestone  
 Fine-loamy slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.3 inches

##### **Lap and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from limestone

Gravelly residuum derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

### Additional Components

Judell soils that have slopes of more than 15 percent:  
3 percent of the unit

Maiden and similar soils: 3 percent of the unit

Windham and similar soils: 3 percent of the unit

Rock outcrop: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1921E—Judell-Lap, very stony, complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,000 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

### Component Description

#### Judell and similar soils

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 15 to 35 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from limestone

Fine-loamy slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 9.3 inches

#### Lap and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from limestone

Gravelly residuum derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

### Additional Components

Judell soils that have slopes of less than 15 percent: 6 percent of the unit

Maiden and similar soils: 4 percent of the unit

Windham and similar soils: 3 percent of the unit

Rock outcrop: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1930E—Elmark-Kellygulch, very bouldery-Rock outcrop complex, 8 to 35 percent slopes

### Map Unit Setting

*Landscape:* Mountains, foothills

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

### Component Description

#### Elmark and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, mountainsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Sandy clay loam

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium over sandy and gravelly residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium over sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.0 inches

#### Kellygulch and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy colluvium over residuum derived from granite

Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.0 inches

### **Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### **Additional Components**

Kellygulch soils that have slopes of more than 35 percent: 7 percent of the unit

Shaboom and similar soils: 5 percent of the unit

Hoyt and similar soils: 4 percent of the unit

Lumpgulch and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1933E—Elmark, bouldery-Breton-Shaboom, bouldery, complex, 15 to 45 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains, foothills

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

### **Component Description**

#### **Elmark and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, mountainsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium over sandy and gravelly residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium over sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.7 inches

#### **Breton and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, terraces

*Slope:* 15 to 45 percent

*Surface layer texture:* Coarse sandy loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy alluvium derived from granite

Coarse-loamy colluvium derived from granite

Coarse-loamy slope alluvium derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 6.4 inches

#### **Shaboom and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Cobbly sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from granite

Gravelly slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

### Additional Components

Hoyt and similar soils: 5 percent of the unit  
 Kellygulch and similar soils: 5 percent of the unit  
 Lumpgulch and similar soils: 3 percent of the unit  
 Rock outcrop: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1940E—Elmark, bouldery-Lumpgulch, very bouldery-Rock outcrop complex, 8 to 35 percent slopes

### Map Unit Setting

*Landscape:* Mountains, foothills  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

### Component Description

#### Elmark and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, mountainsides, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Sandy clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium over sandy and gravelly residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium over sandy and gravelly residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 4.0 inches

#### Lumpgulch and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Sandy clay loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from granite over residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.4 inches

### Rock outcrop

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Kellygulch and similar soils: 6 percent of the unit  
 Hoyt and similar soils: 5 percent of the unit  
 Shaboom and similar soils: 5 percent of the unit  
 Bignell and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1945E—Elmark, bouldery-Lumpgulch, very bouldery-Rock outcrop complex, 8 to 35 percent slopes, dry

### Map Unit Setting

*Landscape:* Mountains, foothills  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

### Component Description

#### Elmark and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, mountainsides, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Sandy clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium over sandy and gravelly residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium over sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 4.0 inches**Lumpgulch and similar soils***Extent:* 25 percent of the map unit*Geomorphic position:* Escarpments, hillsides, ridges*Slope:* 8 to 35 percent*Surface layer texture:* Sandy clay loam*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)*Drainage class:* Well drained*Parent material:*

Fine-loamy colluvium derived from granite over residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 3.4 inches**Rock outcrop***Extent:* 15 percent of the map unit*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.**Additional Components**

Elmark, gravelly, and similar soils: 6 percent of the unit

Kellygulch and similar soils: 5 percent of the unit

Shaboom and similar soils: 5 percent of the unit

Hoyt and similar soils: 4 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1946E—Elmark, bouldery-Hoyt-Shaboom, very bouldery, complex, 8 to 35 percent slopes, dry****Map Unit Setting***Landscape:* Mountains, foothills*Elevation:* 4,400 to 6,000 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 90 to 105 days**Component Description****Elmark and similar soils***Extent:* 40 percent of the map unit*Geomorphic position:* Escarpments, hillsides, mountainsides, ridges*Slope:* 8 to 35 percent*Surface layer texture:* Sandy clay loam*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)*Drainage class:* Well drained*Parent material:*

Fine-loamy colluvium over sandy and gravelly residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium over sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 4.0 inches**Hoyt and similar soils***Extent:* 25 percent of the map unit*Geomorphic position:* Alluvial fans, hillsides*Slope:* 8 to 15 percent*Surface layer texture:* Loam*Restrictive feature:* None noted*Drainage class:* Well drained*Parent material:*

Fine-loamy colluvium derived from basalt  
 Fine-loamy slope alluvium derived from basalt  
 Fine-loamy till

*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 9.1 inches**Shaboom and similar soils***Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Gravelly sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from granite  
 Gravelly slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

### Additional Components

Elmark, very bouldery, and similar soils: 5 percent of the unit  
 Lumpgulch and similar soils: 5 percent of the unit  
 Kellygulch and similar soils: 3 percent of the unit  
 Rock outcrop: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1947E—Elmark, bouldery-Burtoner-Rock outcrop complex, 8 to 45 percent slopes

### Map Unit Setting

*Landscape:* Mountains, foothills  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 70 to 105 days

### Component Description

#### Elmark and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, mountainsides, ridges  
*Slope:* 8 to 45 percent  
*Surface layer texture:* Gravelly coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium over sandy and gravelly residuum derived from granite

Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium over sandy and gravelly residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.5 inches

#### Burtoner and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 8 to 45 percent  
*Surface layer texture:* Sandy clay loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy alluvium over residuum derived from granite  
 Fine-loamy colluvium over residuum derived from granite  
 Fine-loamy residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.6 inches

#### Rock outcrop

*Extent:* 10 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Clancy and similar soils: 5 percent of the unit  
 Shaboom and similar soils: 4 percent of the unit  
 Baxton and similar soils: 3 percent of the unit  
 Hoyt and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1948E—Elmark, very bouldery-Skyview, very bouldery-Rock outcrop complex, 15 to 45 percent slopes

### Map Unit Setting

*Landscape:* Mountains, foothills  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

## Component Description

### Elmark and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, mountainsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Very cobbly sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium over sandy and gravelly residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium over sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.3 inches

### Skyview and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Very cobbly sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Colluvium derived from granite over residuum derived from granite

Gravelly residuum derived from granite

Gravelly slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.0 inches

### Rock outcrop

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

## Additional Components

Hoyt and similar soils: 5 percent of the unit

Shaboom and similar soils: 5 percent of the unit

Skyview, gravelly, and similar soils: 5 percent of the unit

## Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1950F—Franconi, very bouldery-Warwood-Caseypeak, very bouldery, complex, 25 to 60 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

## Component Description

### Franconi and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Gravelly sandy clay loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium over residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.0 inches

### Warwood and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 25 to 60 percent

*Surface layer texture:* Gravelly sandy clay loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 8.1 inches

**Caseypeak and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Mountainsides, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Very gravelly sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Loamy and gravelly slope alluvium over residuum derived from granite  
 Sandy and gravelly residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.0 inch

**Additional Components**

Rock outcrop: 5 percent of the unit  
 Releep and similar soils: 5 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1960D—Lumpgulch, bouldery-Hoyt-Shaboom, very bouldery, complex, 4 to 15 percent slopes**

**Map Unit Setting**

*Landscape:* Foothills, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

**Component Description****Lumpgulch and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Sandy clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium derived from granite over residuum derived from granite  
 Fine-loamy residuum derived from granite

Fine-loamy slope alluvium derived from granite over residuum derived from granite

*Flooding:* None

*Available water capacity:* Mainly 3.4 inches

**Hoyt and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium derived from basalt  
 Fine-loamy slope alluvium derived from basalt  
 Fine-loamy till  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 9.1 inches

**Shaboom and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Gravelly coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from granite  
 Gravelly slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.1 inches

**Additional Components**

Elmark and similar soils: 6 percent of the unit  
 Kellygulch and similar soils: 5 percent of the unit  
 Rock outcrop: 4 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**1961E—Lumpgulch, bouldery-Hoyt-Shaboom, very bouldery, complex, 15 to 45 percent slopes**

**Map Unit Setting**

*Landscape:* Foothills, mountains

*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

### Component Description

#### Lumpgulch and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Sandy clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium derived from granite over residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.4 inches

#### Hoyt and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium derived from basalt  
 Fine-loamy slope alluvium derived from basalt  
 Fine-loamy till  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 9.1 inches

#### Shaboom and similar soils

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Cobbly sandy clay loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from granite  
 Gravelly slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

### Additional Components

Elmark and similar soils: 4 percent of the unit  
 Hoyt soils that have slopes of less than 15 percent: 3 percent of the unit  
 Kellygulch and similar soils: 3 percent of the unit  
 Rock outcrop: 3 percent of the unit  
 Bignell and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1962E—Lumpgulch, bouldery-Yreka, very bouldery-Shaboom, very bouldery, complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

### Component Description

#### Lumpgulch and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium derived from granite over residuum derived from granite  
 Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.4 inches

#### Yreka and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, mountain slopes, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Gravelly colluvium derived from mixed, fine grained igneous, sedimentary, and metamorphic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 7.1 inches

### **Shaboom and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Cobbly sandy clay loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from granite

Gravelly slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

### **Additional Components**

Hoyt and similar soils: 3 percent of the unit

Rock outcrop: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **1963F—Lumpgulch, very bouldery-Rock outcrop-Kellygulch, very bouldery, complex, 25 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

### **Component Description**

#### **Lumpgulch and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Sandy clay loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from granite over residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.4 inches

### **Rock outcrop**

*Extent:* 30 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### **Kellygulch and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy colluvium over residuum derived from granite

Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.0 inches

### **Additional Components**

Shaboom and similar soils: 6 percent of the unit

Hoyt and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1964E—Lumpgulch, very bouldery-Shaboom, very bouldery-Rock outcrop complex, 8 to 25 percent slopes

### Map Unit Setting

*Landscape:* Foothills

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

### Component Description

#### Lumpgulch and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 8 to 25 percent

*Surface layer texture:* Sandy clay loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from granite over residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.4 inches

#### Shaboom and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 8 to 25 percent

*Surface layer texture:* Cobbly sandy clay loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from granite

Gravelly slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

#### Rock outcrop

*Extent:* 30 percent of the map unit

*Definition:* This component consists mainly of exposed

areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Kellygulch and similar soils: 6 percent of the unit

Hoyt and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1965E—Lumpgulch, bouldery-Ymark, very bouldery-Rock outcrop complex, 15 to 45 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

### Component Description

#### Lumpgulch and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Gravelly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from granite over residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.8 inches

#### Ymark and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, mountain slopes, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Gravelly sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Depth to restrictive feature:* 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:* Gravelly colluvium derived from granite and fine grained igneous rock over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.9 inches

### Rock outcrop

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Shaboom and similar soils: 6 percent of the unit

Kellygulch and similar soils: 5 percent of the unit

Hoyt and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1970E—Bignell, stony-Yreka, very stony, complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains, uplands

*Elevation:* 4,400 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 105 days

### Component Description

#### Bignell and similar soils

*Extent:* 55 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides

*Slope:* 15 to 35 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Clayey colluvium

Clayey slope alluvium

Clayey till

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.1 inches

### Yreka and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, mountain slopes, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Gravelly colluvium derived from mixed, fine grained igneous, sedimentary, and metamorphic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 7.0 inches

### Additional Components

Yreka, stony, and similar soils: 5 percent

Brickner and similar soils: 3 percent

Hoyt and similar soils: 3 percent

Skyview and similar soils: 2 percent

Stemple and similar soils: 2 percent

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1980F—Stemple cobbly loam, 35 to 60 percent slopes, very stony

### Map Unit Setting

*Landscape:* Mountains, foothills

*Elevation:* 4,400 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 105 days

### Component Description

#### Stemple and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Escarpments, mountain slopes

*Slope:* 35 to 60 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from claystone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.9 inches

### Additional Components

Cowood and similar soils: 4 percent of the unit

Tigeron and similar soils: 4 percent of the unit

Bignell and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1990F—Bobowic, very bouldery-Rock outcrop-Tepecreek, very bouldery, complex, 25 to 60 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Bobowic and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Mountain slopes, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Gravelly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly alluvium over residuum derived from granite

Sandy and gravelly colluvium over residuum derived from granite

Sandy and gravelly residuum derived from granite

Sandy and gravelly slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.8 inches

#### Rock outcrop

*Extent:* 30 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

#### Tepecreek and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, mountain slopes, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Very gravelly sandy clay loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from granite

Gravelly slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.6 inches

### Additional Components

Caseypeak and similar soils: 5 percent of the unit

Peeler and similar soils: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 1991D—Bobowic-Clugulch, bouldery-Rock outcrop complex, 4 to 25 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Bobowic and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Mountain slopes, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Gravelly coarse sandy loam

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

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly alluvium over residuum derived from granite

Sandy and gravelly colluvium over residuum derived from granite

Sandy and gravelly residuum derived from granite

Sandy and gravelly slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.8 inches

### **Clugulch and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Mountainsides, ridges

*Slope:* 8 to 25 percent

*Surface layer texture:* Gravelly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Depth to restrictive feature:* 4 to 10 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 0.6 inch

### **Rock outcrop**

*Extent:* 8 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock.

### **Additional Components**

Rubble land: 7 percent of the unit

Branham and similar soils: 6 percent of the unit

Opitz and similar soils: 5 percent of the unit

Caseypeak and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2000E—Skyview, very bouldery-Rock outcrop-Roegulch, very bouldery, complex, 8 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

### **Component Description**

#### **Skyview and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Colluvium derived from granite over residuum derived from granite

Gravelly residuum derived from granite

Gravelly slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.3 inches

### **Rock outcrop**

*Extent:* 30 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### **Roegulch and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Cobbly sandy clay loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Gravelly slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.1 inches

### **Additional Components**

Elmark and similar soils: 4 percent of the unit

Skyview soils that have slopes of more than 35 percent: 4 percent of the unit

Repkie and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2001E—Skyview, very bouldery-Elmark,  
very bouldery-Rock outcrop complex,  
15 to 45 percent slopes**

**Map Unit Setting**

*Landscape:* Foothills, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

**Component Description**

**Skyview and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Escarpments, hillsides,  
ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Very cobbly sandy loam

*Percent of surface covered by rock fragments:* 0.10 to  
3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Colluvium derived from granite over residuum  
derived from granite

Gravelly residuum derived from granite

Gravelly slope alluvium derived from granite over  
residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.0 inches

**Elmark and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Escarpments, hillsides,  
mountainsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Gravelly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to  
3.00 percent (boulders)

*Depth to restrictive feature:* 20 to 40 inches to bedrock  
(paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium over sandy and gravelly  
residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium over sandy and gravelly  
residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.5 inches

**Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of  
exposed areas of hard, coarse grained granite  
bedrock. In places, a thin layer of decomposing  
granite (grus) covers the bedrock. Large, rounded  
boulders of granite are in the vicinity of the  
outcrops.

**Additional Components**

Shaboom and similar soils: 5 percent of the unit

Hoyt and similar soils: 4 percent of the unit

Ymark and similar soils: 4 percent of the unit

Repkie and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2011D—Shawmut gravelly loam, 4 to 15  
percent slopes, bouldery, warm**

**Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

**Component Description**

**Shawmut and similar soils**

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments,  
hillsides

*Slope:* 4 to 15 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to  
0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.4 inches

**Additional Components**

Shawmut soils that have slopes of more than 15  
percent: 8 percent of the unit

Martinsdale and similar soils: 7 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 2012D—Shawmut, stony-Martinsdale, very stony, complex, 4 to 15 percent slopes, warm

#### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

#### Component Description

##### Shawmut and similar soils

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.6 inches

##### Martinsdale and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Calcareous, fine-loamy alluvium derived from granite  
 Calcareous, fine-loamy slope alluvium derived from fine grained sandstone, siltstone, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.1 inches

### Additional Components

Shawmut soils that have slopes of more than 15 percent: 6 percent of the unit  
 Martinsdale loam and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 2012E—Shawmut, stony-Martinsdale, very stony, complex, 15 to 25 percent slopes, warm

#### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

#### Component Description

##### Shawmut and similar soils

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides  
*Slope:* 15 to 25 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.6 inches

##### Martinsdale and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 15 to 25 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Calcareous, fine-loamy alluvium derived from granite  
 Calcareous, fine-loamy slope alluvium derived

from fine grained sandstone, siltstone, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.1 inches

### **Additional Components**

Wimper and similar soils: 6 percent of the unit  
Martinsdale soils that have slopes of less than 15 percent: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2013E—Shawmut, bouldery-Wickes, stony-Tolbert, bouldery, complex, 15 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

### **Component Description**

#### **Shawmut and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides

*Slope:* 15 to 35 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.4 inches

#### **Wickes and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, interfluves, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt over residuum derived from basalt

Gravelly colluvium over residuum derived from sandstone

Gravelly slope alluvium over residuum derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.9 inches

### **Tolbert and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, interfluves, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.0 inch

### **Additional Components**

Wimper and similar soils: 6 percent of the unit  
Martinsdale and similar soils: 5 percent of the unit  
Rock outcrop: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2014E—Shawmut-Tolbert complex, 8 to 35 percent slopes, warm**

### **Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 3,600 to 6,200 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

### **Component Description**

#### **Shawmut and similar soils**

*Extent:* 60 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides

*Slope:* 15 to 35 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.0 inches

### **Tolbert and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, interfluves, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Cobbly loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

### **Additional Components**

Wimper and similar soils: 6 percent of the unit

Martinsdale and similar soils: 5 percent of the unit

Rock outcrop: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2020D—Shawmut, stony-Shawmut, bouldery, complex, 4 to 15 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Shawmut, stony, and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides

*Slope:* 4 to 15 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.6 inches

### **Shawmut, bouldery, and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides

*Slope:* 4 to 15 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.3 inches

### **Additional Components**

Martinsdale and similar soils: 5 percent of the unit

Gnojek and similar soils: 4 percent of the unit

Blaincreek and similar soils: 3 percent of the unit

Wickes and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2030E—Kokoruda-Elmark, very bouldery-Rock outcrop complex, 8 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, mountains, river valleys, valleys

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 22 inches

*Frost-free period:* 90 to 105 days

### Component Description

#### Kokoruda and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, swales  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Fine-loamy alluvium  
     Fine-loamy slope alluvium  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 7.9 inches

#### Elmark and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, mountainsides, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Fine-loamy colluvium over sandy and gravelly residuum derived from granite  
     Fine-loamy residuum derived from granite  
     Fine-loamy slope alluvium over sandy and gravelly residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 4.0 inches

#### Rock outcrop

*Extent:* 10 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Eagleton and similar soils: 6 percent of the unit  
 Lumpgulch and similar soils: 5 percent of the unit  
 Shaboom and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 2031D—Eagleton, stony-Kokoruda-Cometcrik complex, 2 to 25 percent slopes

#### Map Unit Setting

*Landscape:* River valleys, valleys, foothills, mountains  
*Elevation:* 3,800 to 6,000 feet  
*Mean annual precipitation:* 10 to 22 inches  
*Frost-free period:* 80 to 115 days

### Component Description

#### Eagleton and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Poorly drained  
*Parent material:* Fine-loamy alluvium  
*Native plant cover type:* Forest land  
*Frequency of flooding:* Rare  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 9.4 inches

#### Kokoruda and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, swales  
*Slope:* 8 to 25 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Fine-loamy alluvium  
     Fine-loamy slope alluvium  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 7.9 inches

#### Cometcrik and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Poorly drained  
*Parent material:* Fine-loamy alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Frequent  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 9.4 inches

### Additional Components

Hoyt and similar soils: 6 percent of the unit  
Wetsand and similar soils: 5 percent of the unit  
Yreka and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2040F—Shaboom, extremely bouldery-Rock outcrop-Rubble land association, 35 to 70 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Shaboom and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Sandy loam  
*Percent of surface covered by rock fragments:* 3 to 15 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly residuum derived from granite  
Gravelly slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

#### Rock outcrop

*Extent:* 20 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock.

#### Rubble land

*Extent:* 20 percent of the map unit  
*Definition:* This component consists of areas of hard, rounded granite cobbles, stones, and boulders.

### Additional Components

Kellygulch and similar soils: 6 percent of the unit

Elmark and similar soils: 5 percent of the unit  
Ashbray and similar soils: 4 percent of the unit  
Breeton and similar soils: 4 percent of the unit  
Burtoner and similar soils: 3 percent of the unit  
Sawbuck and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2041F—Rock outcrop-Catgulch, bouldery, complex, 15 to 70 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

### Component Description

#### Rock outcrop

*Extent:* 60 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

#### Catgulch and similar soils

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs  
*Slope:* 15 to 70 percent  
*Surface layer texture:* Gravelly sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 0.9 inch

### Additional Components

Ashbray and similar soils: 6 percent of the unit  
Shaboom and similar soils: 5 percent of the unit  
Connieo and similar soils: 4 percent of the unit  
Crampton and similar soils: 4 percent of the unit  
Breeton and similar soils: 3 percent of the unit  
Clancy and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **2042F—Rock outcrop-Cheadle, very bouldery-Tiban, very bouldery, complex, 15 to 50 percent slopes**

#### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

#### Component Description

##### Rock outcrop

*Extent:* 35 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard sedimentary and metamorphic bedrock. Angular cobbles, stones, and boulders litter the areas and accumulate at the base of hills and escarpments.

##### Cheadle and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Escarpments, mountain slopes, ridges

*Slope:* 15 to 50 percent

*Surface layer texture:* Stony loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.5 inches

##### Tiban and similar soils

*Extent:* 15 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 15 to 35 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from  
metavolcanics

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.7 inches

#### Additional Components

Helmville and similar soils: 6 percent of the unit

Kimpton and similar soils: 5 percent of the unit

Ratiopeak and similar soils: 5 percent of the unit

Tibkey and similar soils: 4 percent of the unit

#### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **2043F—Rencot, very stony-Rencot, bouldery-Rock outcrop association, 15 to 60 percent slopes**

#### Map Unit Setting

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 90 to 115 days

#### Component Description

##### Rencot, very stony, and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, strath terraces

*Slope:* 15 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from fine grained sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.4 inches

##### Rencot, bouldery, and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, strath terraces

*Slope:* 15 to 60 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.4 inches

### Rock outcrop

*Extent:* 20 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

### Additional Components

Rubble land: 15 percent of the unit  
 Bronec and similar soils: 4 percent of the unit  
 Geohrock and similar soils: 3 percent of the unit  
 Sieben and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2045F—Caseypeak, very stony-Rock outcrop-Rubble land association, 15 to 60 percent slopes, dry

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 8,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Caseypeak and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Mountainsides, ridges  
*Slope:* 15 to 60 percent  
*Surface layer texture:* Very cobbly coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)

*Drainage class:* Well drained  
*Parent material:*  
 Loamy and gravelly slope alluvium over residuum derived from granite  
 Sandy and gravelly residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.0 inch

### Rock outcrop

*Extent:* 25 percent of the map unit  
*Definition:* This component consists of exposures of hard, coarse grained (granite) and fine grained (basalt or rhyolite) bedrock. In granitic areas, a thin layer of decomposing granite (grus) covers the surface.

### Rubble land

*Extent:* 20 percent of the map unit  
*Definition:* This component consists of areas of rounded granite and angular basalt or rhyolite cobbles, stones, and boulders.

### Additional Components

Hiore and similar soils: 6 percent of the unit  
 Peeler and similar soils: 5 percent of the unit  
 Clugulch and similar soils: 4 percent of the unit  
 Warwood and similar soils: 4 percent of the unit  
 Tepecreek and similar soils: 3 percent of the unit  
 Tuggle and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2046F—Caseypeak, very bouldery-Rock outcrop-Rubble land association, 15 to 60 percent slopes, cool

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 6,000 to 8,500 feet  
*Mean annual precipitation:* 20 to 30 inches  
*Frost-free period:* 30 to 60 days

### Component Description

#### Caseypeak and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Mountainsides, ridges  
*Slope:* 15 to 60 percent

*Surface layer texture:* Very cobbly coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Loamy and gravelly slope alluvium over residuum derived from granite

Sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.0 inch

### **Rock outcrop**

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock.

### **Rubble land**

*Extent:* 25 percent of the map unit

*Definition:* This component consists of areas of hard, rounded granite cobbles, stones, and boulders.

### **Additional Components**

Tepecreek and similar soils: 6 percent of the unit

Warwood and similar soils: 5 percent of the unit

Cowood and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2051E—Opitz, bouldery-Branham, very bouldery-Tuggle, very bouldery, complex, 8 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 8,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Opitz and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Mountain slopes, plateaus, ridges

*Slope:* 8 to 15 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy colluvium over residuum derived from granite

Coarse-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

#### **Branham and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Mountain slopes, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Cobbly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly residuum derived from granite

Sandy and gravelly colluvium over residuum derived from granite

Coarse-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.9 inches

#### **Tuggle and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Escarpments, mountain slopes, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Very cobbly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Loamy residuum derived from granite

Loamy slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.2 inches

### Additional Components

Rock outcrop: 3 percent of the unit  
 Branham loam and similar soils: 2 percent of the unit  
 Clugulch and similar soils: 2 percent of the unit  
 Tepecreek and similar soils: 2 percent of the unit  
 Foolhen and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2081F—Windham, very stony-Rock outcrop-Lap, very stony, complex, 35 to 70 percent slopes, warm

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,000 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

### Component Description

#### Windham and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from limestone  
     Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.5 inches

#### Rock outcrop

*Extent:* 25 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard limestone bedrock. Limestone cobbles and stones litter the areas and accumulate at the base of hills and escarpments.

#### Lap and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 35 to 70 percent

*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium over residuum derived from limestone  
     Gravelly residuum derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.3 inches

### Additional Components

Maiden and similar soils: 8 percent of the unit  
 Judell and similar soils: 7 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2082D—Windham-Judell complex, 8 to 15 percent slopes, warm

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 105 days

### Component Description

#### Windham and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from limestone  
     Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.1 inches

#### Judell and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 8 to 15 percent

*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium derived from limestone  
 Fine-loamy slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.6 inches

### Additional Components

Windham, stony, and similar soils: 6 percent of the unit  
 Judell cobbly loam and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2084E—Windham, stony-Maiden, very stony-Lap, very stony, complex, 15 to 35 percent slopes, warm

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,000 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

### Component Description

#### Windham and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from limestone  
 Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 4.1 inches

#### Maiden and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent

*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium over residuum derived from limestone  
 Gravelly residuum derived from limestone  
 Gravelly slope alluvium over residuum derived from limestone  
*Flooding:* None  
*Available water capacity:* Mainly 1.7 inches

### Lap and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium over residuum derived from limestone  
 Gravelly residuum derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.3 inches

### Additional Components

Maiden soils that have slopes of more than 35 percent: 8 percent of the unit  
 Judell and similar soils: 7 percent of the unit  
 Wimper and similar soils: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2086E—Windham-Windham, stony, complex, 15 to 35 percent slopes, warm

### Map Unit Setting

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

### Component Description

#### Windham and similar soils

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from limestone  
 Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 4.0 inches

#### Windham, stony, and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from limestone  
 Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 4.1 inches

### Additional Components

Judell and similar soils: 4 percent of the unit  
 Maiden and similar soils: 4 percent of the unit  
 Silverchief and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2088D—Windham-Judell gravelly loams, 8 to 25 percent slopes, stony, warm

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

### Component Description

#### Windham and similar soils

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 8 to 25 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from limestone  
 Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.1 inches

#### Judell and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, terraces  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Fine-loamy colluvium derived from limestone  
 Fine-loamy slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 7.4 inches

### Additional Components

Maiden and similar soils: 8 percent of the unit  
 Judell soils that have slopes of less than 8 percent: 7 percent of the unit  
 Wimper and similar soils: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2090F—Caseypeak, very bouldery-Franconi, very bouldery-Rock outcrop complex, 25 to 60 percent slopes

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 8,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Caseypeak and similar soils

*Extent:* 45 percent of the map unit

*Geomorphic position:* Mountainsides, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Gravelly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Loamy and gravelly slope alluvium over residuum derived from granite

Sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.1 inches

#### Franconi and similar soils

*Extent:* 15 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium over residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.6 inches

#### Rock outcrop

*Extent:* 10 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock.

### Additional Components

Rubble land: 10 percent of the unit

Bobowic and similar soils: 7 percent of the unit

Peeler and similar soils: 6 percent of the unit

Tepecreek and similar soils: 4 percent of the unit

Tuggle and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2091E—Caseypeak, bouldery-Franconi, bouldery-Rock outcrop complex, 8 to 35 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Caseypeak and similar soils

*Extent:* 45 percent of the map unit

*Geomorphic position:* Mountainsides, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Gravelly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Loamy and gravelly slope alluvium over residuum derived from granite

Sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.1 inches

#### Franconi and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Gravelly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium over residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.7 inches

### Rock outcrop

*Extent:* 10 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock.

### Additional Components

Rubble land: 10 percent of the unit

Bobowic and similar soils: 6 percent of the unit

Peeler and similar soils: 5 percent of the unit

Tepecreek and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2110D—Sebud very cobbly loam, 4 to 15 percent slopes, very stony

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Sebud and similar soils

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 4 to 15 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.6 inches

### Additional Components

Surdal and similar soils: 4 percent of the unit

Arrowpeak and similar soils: 3 percent of the unit

Libeg and similar soils: 3 percent of the unit

Tibkey and similar soils: 3 percent of the unit

Rock outcrop: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2111E—Sebud, very stony-Hapgood complex, 8 to 45 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,000 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Sebud and similar soils

*Extent:* 55 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 8 to 45 percent

*Surface layer texture:* Loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.6 inches

#### Hapgood and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, mountain slopes

*Slope:* 8 to 45 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from basalt

Gravelly slope alluvium over residuum derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.6 inches

**Additional Components**

Surdal and similar soils: 4 percent of the unit  
 Arrowpeak and similar soils: 3 percent of the unit  
 Tiban and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2112D—Sebud-Marcel complex, 4 to 25 percent slopes, bouldery****Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

**Component Description****Sebud and similar soils**

*Extent:* 65 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 15 to 25 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from metavolcanics  
     Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.1 inches

**Marcel and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 15 to 25 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat poorly drained  
*Parent material:*  
     Gravelly slope alluvium derived from basalt  
     Gravelly slope alluvium derived from metavolcanics  
     Gravelly alpine till  
*Native plant cover type:* Rangeland

*Flooding:* None

*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 7.5 inches

**Additional Components**

Tibkey and similar soils: 4 percent of the unit  
 Libeg and similar soils: 3 percent of the unit  
 Surdal and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2121F—Hapgood-Hanson-Tiban complex, 25 to 60 percent slopes, very stony****Map Unit Setting**

*Landscape:* Mountains, foothills, uplands  
*Elevation:* 4,400 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 95 days

**Component Description****Hapgood and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, mountain slopes  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Very stony loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium over residuum derived from basalt  
     Gravelly slope alluvium over residuum derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.5 inches

**Hanson and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Very stony loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from limestone

Gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.1 inches

### **Tiban and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.7 inches

### **Additional Components**

Burtoner and similar soils: 5 percent of the unit

Connieo and similar soils: 5 percent of the unit

Firada and similar soils: 4 percent of the unit

Rock outcrop: 4 percent of the unit

Breeton and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2122F—Hapgood-Tiban complex, 35 to 70 percent slopes, very stony**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,000 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Hapgood and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, mountain slopes

*Slope:* 35 to 60 percent

*Surface layer texture:* Very stony loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from basalt

Gravelly slope alluvium over residuum derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.5 inches

### **Tiban and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 35 to 70 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 6.0 inches

### **Additional Components**

Elve and similar soils: 4 percent of the unit

Worock and similar soils: 4 percent of the unit

Arrowpeak and similar soils: 3 percent of the unit

Hiore and similar soils: 3 percent of the unit

Rock outcrop: 3 percent of the unit

Sebud and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2123F—Hapgood-Sebud-Arrowpeak complex, 35 to 60 percent slopes, very stony**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,000 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Hapgood and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, mountain slopes

*Slope:* 35 to 60 percent

*Surface layer texture:* Very stony loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from basalt

Gravelly slope alluvium over residuum derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.5 inches

#### Sebud and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 35 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.6 inches

#### Arrowpeak and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Mountain slopes, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly colluvium over residuum derived from basalt

Gravelly residuum derived from tuffaceous volcanic rock

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

### Additional Components

Rock outcrop: 6 percent of the unit

Hiore and similar soils: 5 percent of the unit

Tiban and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 2125F—Cowood, rubbly-Elve, very stony-Rock outcrop complex, 25 to 60 percent slopes

#### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Cowood and similar soils

*Extent:* 45 percent of the map unit

*Geomorphic position:* Escarpments, mountainsides, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Very stony loam

*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from sandstone

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

#### Elve and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.2 inches

### **Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

### **Additional Components**

Rubble land: 15 percent of the unit

Redfern and similar soils: 3 percent of the unit

Tigeron and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2151E—Releep, very bouldery-Kurrie, very bouldery-Rock outcrop complex, 15 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Releep and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Mountain slopes, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Cobbly sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.4 inches

#### **Kurrie and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Very cobbly sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Depth to restrictive feature:* 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from granite

Gravelly slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.8 inches

### **Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### **Additional Components**

Caseypeak and similar soils: 5 percent of the unit

Peeler and similar soils: 5 percent of the unit

Warwood and similar soils: 5 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2161E—Ellena, bouldery-Worock, very bouldery-Rock outcrop complex, 15 to 45 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Ellena and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Mountain slopes, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from granite over sandy and gravelly residuum derived from granite

Gravelly residuum derived from granite

Gravelly slope alluvium derived from granite over sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.8 inches

**Worock and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 15 to 45 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

Gravelly till derived from fine grained igneous and metamorphic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.2 inches

**Rock outcrop**

*Extent:* 8 percent of the map unit

*Definition:* This component consists of exposures of hard, coarse grained (granite) and fine grained (basalt or rhyolite) bedrock. In granitic areas, a thin layer of decomposing granite (grus) covers the surface.

**Additional Components**

Rubble land: 7 percent of the unit

Cowood and similar soils: 4 percent of the unit

Rubick and similar soils: 3 percent of the unit

Tepecreek and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2161F—Kurrie, very bouldery-Ellena, very bouldery-Rock outcrop complex, 25 to 60 percent slopes****Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

**Component Description****Kurrie and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Stony sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Depth to restrictive feature:* 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from granite

Gravelly slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.9 inches

**Ellena and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Mountain slopes, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from granite over sandy and gravelly residuum derived from granite

Gravelly residuum derived from granite

Gravelly slope alluvium derived from granite over sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.6 inches

**Rock outcrop**

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

**Additional Components**

Caseypeak and similar soils: 5 percent of the unit

Peeler and similar soils: 5 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2171F—Hiore-Kurrie, stony, complex, 25 to 60 percent slopes****Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

**Component Description****Hiore and similar soils**

*Extent:* 60 percent of the map unit

*Geomorphic position:* Mountain slopes, mountain valleys

*Slope:* 25 to 60 percent

*Surface layer texture:* Sandy loam

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Sandy and gravelly residuum derived from granite

Sandy and gravelly slope alluvium derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.3 inches

**Kurrie and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Depth to restrictive feature:* 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from granite

Gravelly slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.9 inches

**Additional Components**

Tepecreek and similar soils: 10 percent of the unit

Caseypeak and similar soils: 5 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2172F—Rubick, very stony-Rock outcrop complex, 35 to 60 percent slopes****Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

**Component Description****Rubick and similar soils**

*Extent:* 75 percent of the map unit

*Geomorphic position:* Mountain slopes, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Cobbly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:* Gravelly slope alluvium derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.9 inches

**Rock outcrop**

*Extent:* 8 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock.

### Additional Components

Rubble land: 7 percent of the unit  
Caseypeak and similar soils: 5 percent of the unit  
Worock and similar soils: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2173F—Rubick gravelly sandy loam, 35 to 60 percent slopes, stony

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 8,000 feet  
*Mean annual precipitation:* 15 to 30 inches  
*Frost-free period:* 30 to 70 days

### Component Description

#### Rubick and similar soils

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Gravelly sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:* Gravelly slope alluvium derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.9 inches

### Additional Components

Rock outcrop: 3 percent of the unit  
Tepecreek and similar soils: 3 percent of the unit  
Lowder and similar soils: 2 percent of the unit  
Rubble land: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2181F—Repkie, very stony-Yreka, stony-Skyview, very bouldery, complex, 25 to 60 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains  
*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

### Component Description

#### Repkie and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, mountain slopes, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Very gravelly coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:* Gravelly colluvium derived from basalt over gravelly colluvium derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.6 inches

#### Yreka and similar soils

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, mountain slopes, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Gravelly colluvium derived from mixed, fine grained igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 6.9 inches

#### Skyview and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Gravelly sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Colluvium derived from granite over residuum derived from granite  
Gravelly residuum derived from granite  
Gravelly slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 2.2 inches

### **Additional Components**

Roegulch and similar soils: 6 percent of the unit  
 Hoyt and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2211E—Sebud-Arrowpeak, stony, complex, 8 to 45 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 8,000 feet  
*Mean annual precipitation:* 15 to 30 inches  
*Frost-free period:* 30 to 70 days

### **Component Description**

#### **Sebud and similar soils**

*Extent:* 65 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.7 inches

#### **Arrowpeak and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 8 to 15 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*

Gravelly residuum derived from basalt  
 Gravelly colluvium over residuum derived from basalt  
 Gravelly residuum derived from tuffaceous volcanic rock

*Native plant cover type:* Rangeland

*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

### **Additional Components**

Surdal and similar soils: 4 percent of the unit  
 Rock outcrop: 3 percent of the unit  
 Sebud, stony, and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2211F—Sebud, very stony-Arrowpeak, very stony-Rock outcrop complex, 35 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Sebud and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.6 inches

#### **Arrowpeak and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*

Gravelly residuum derived from basalt  
 Gravelly colluvium over residuum derived from basalt

Gravelly residuum derived from tuffaceous volcanic rock

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

### **Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

### **Additional Components**

Rubble land: 10 percent of the unit

Libeg and similar soils: 6 percent of the unit

Surdal and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2212D—Sebud, very stony-Libeg-Arrowpeak, stony, complex, 4 to 15 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Sebud and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 4 to 15 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.6 inches

#### **Libeg and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces

*Slope:* 4 to 15 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly alluvium

Gravelly colluvium

Gravelly slope alluvium

Gravelly till

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.7 inches

#### **Arrowpeak and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Mountain slopes, ridges

*Slope:* 4 to 15 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly colluvium over residuum derived from basalt

Gravelly residuum derived from tuffaceous volcanic rock

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.4 inches

### **Additional Components**

Surdal and similar soils: 4 percent of the unit

Rock outcrop: 3 percent of the unit

Tibkey and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2212E—Sebud, very stony-Libeg, stony-Arrowpeak, stony, complex, 15 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

## Component Description

### Sebud and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.6 inches

### Libeg and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly alluvium  
 Gravelly colluvium  
 Gravelly slope alluvium  
 Gravelly till  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.9 inches

### Arrowpeak and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly colluvium over residuum derived from basalt  
 Gravelly residuum derived from tuffaceous volcanic rock

*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.4 inches

## Additional Components

Surdal and similar soils: 4 percent of the unit  
 Tibkey and similar soils: 3 percent of the unit  
 Worock and similar soils: 3 percent of the unit

## Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2213E—Sebud, stony-Surdal, stony-Arrowpeak, very stony, complex, 8 to 35 percent slopes

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

## Component Description

### Sebud and similar soils

*Extent:* 55 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.6 inches

### Surdal and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, mountain slopes, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from basalt

Gravelly slope alluvium derived from basalt over residuum derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.0 inches

**Arrowpeak and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Mountain slopes, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly colluvium over residuum derived from basalt

Gravelly residuum derived from tuffaceous volcanic rock

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

**Additional Components**

Libeg and similar soils: 3 percent of the unit

Tibkey and similar soils: 3 percent of the unit

Marcel and similar soils: 2 percent of the unit

Rock outcrop: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2213F—Sebud, stony-Surdal, stony-Arrowpeak, very stony, complex, 35 to 60 percent slopes****Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

**Component Description****Sebud and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 35 to 60 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.6 inches

**Surdal and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Escarpments, mountain slopes, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from basalt

Gravelly slope alluvium derived from basalt over residuum derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.0 inches

**Arrowpeak and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Mountain slopes, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly colluvium over residuum derived from basalt

Gravelly residuum derived from tuffaceous volcanic rock

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

### Additional Components

Rock outcrop: 4 percent of the unit  
 Libeg and similar soils: 2 percent of the unit  
 Marcel and similar soils: 2 percent of the unit  
 Tibkey and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2214E—Sebud, bouldery-Surdal, very bouldery-Arrowpeak, very bouldery, complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 6,500 to 8,000 feet  
*Mean annual precipitation:* 20 to 30 inches  
*Frost-free period:* 30 to 60 days

### Component Description

#### Sebud and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.1 inches

#### Surdal and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, mountain slopes, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium over residuum derived from basalt

Gravelly slope alluvium derived from basalt over residuum derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.0 inches

### Arrowpeak and similar soils

*Extent:* 20 percent of the map unit

*Geomorphic position:* Mountain slopes, ridges

*Slope:* 15 to 35 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly colluvium over residuum derived from basalt

Gravelly residuum derived from tuffaceous volcanic rock

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

### Additional Components

Arrowpeak soils that have slopes of less than 15 percent: 6 percent of the unit

Rock outcrop: 5 percent of the unit

Worock and similar soils: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2215D—Sebud-Tibkey cobbly loams, 2 to 15 percent slopes, bouldery

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Sebud and similar soils

*Extent:* 55 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 2 to 15 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.1 inches

### **Tibkey and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 2 to 15 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Somewhat poorly drained

*Parent material:*

Gravelly slope alluvium derived from basalt

Gravelly till derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 6.3 inches

### **Additional Components**

Surdal and similar soils: 4 percent of the unit

Marcel and similar soils: 3 percent of the unit

Monaberg and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2216D—Sebud-Surdal complex, 4 to 25 percent slopes, stony**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 6,500 to 8,000 feet

*Mean annual precipitation:* 20 to 30 inches

*Frost-free period:* 30 to 60 days

### **Component Description**

#### **Sebud and similar soils**

*Extent:* 60 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 4 to 25 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.9 inches

### **Surdal and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Escarpments, mountain slopes, ridges

*Slope:* 4 to 25 percent

*Surface layer texture:* Very gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from basalt

Gravelly slope alluvium derived from basalt over residuum derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.0 inches

### **Additional Components**

Arrowpeak and similar soils: 3 percent of the unit

Rock outcrop: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2221E—Arrowpeak, very stony-Surdal, stony-Rock outcrop complex, 8 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 8,000 feet

*Mean annual precipitation:* 15 to 30 inches

*Frost-free period:* 30 to 70 days

### **Component Description**

#### **Arrowpeak and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Mountain slopes, ridges

*Slope:* 8 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly colluvium over residuum derived from basalt  
 Gravelly residuum derived from tuffaceous volcanic rock  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.3 inches

#### **Surdal and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, mountain slopes, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium over residuum derived from basalt  
 Gravelly slope alluvium derived from basalt over residuum derived from basalt  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.0 inches

#### **Rock outcrop**

*Extent:* 15 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

#### **Additional Components**

Rubble land: 15 percent of the unit  
 Libeg and similar soils: 3 percent of the unit  
 Sebud and similar soils: 3 percent of the unit  
 Tibkey and similar soils: 2 percent of the unit  
 Tigeron and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **2222F—Arrowpeak, very stony-Sebud, stony-Surdal, very stony, complex, 25 to 60 percent slopes**

#### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

#### **Component Description**

##### **Arrowpeak and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly residuum derived from basalt  
 Gravelly colluvium over residuum derived from basalt  
 Gravelly residuum derived from tuffaceous volcanic rock  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.4 inches

##### **Sebud and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 5.9 inches

##### **Surdal and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, mountain slopes, ridges  
*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium over residuum derived from basalt  
 Gravelly slope alluvium derived from basalt over residuum derived from basalt  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.0 inches

#### **Additional Components**

Rock outcrop: 7 percent of the unit  
 Elve and similar soils: 6 percent of the unit  
 Libeg and similar soils: 4 percent of the unit  
 Redfern and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **2230B—Tineman cobbly loam, 2 to 8 percent slopes, very stony**

#### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 8,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

#### **Component Description**

##### **Tineman and similar soils**

*Extent:* 80 percent of the map unit  
*Geomorphic position:* Moraines, mountain slopes, mountain valleys  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Gravelly alluvium over sandy and gravelly recent alluvium derived from igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 6.2 inches

#### **Additional Components**

Adel and similar soils: 7 percent of the unit  
 Sebud and similar soils: 5 percent of the unit  
 Tibkey and similar soils: 5 percent of the unit  
 Mooseflat and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **2251F—Nivean, very stony-Rock outcrop-Rubble land complex, 25 to 60 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,200 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 80 to 95 days

#### **Component Description**

##### **Nivean and similar soils**

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Hillsides, mountain slopes  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from welded tuff  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 0.9 inch

##### **Rock outcrop**

*Extent:* 20 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of welded tuff, rhyolitic tuff, and/or tuffaceous volcanic rocks.

##### **Rubble land**

*Extent:* 15 percent of the map unit  
*Definition:* This component consists of extensive areas of angular to subrounded, tuffaceous cobbles, stones, and boulders. Volcanic ash and glass may be in the soil.

#### **Additional Components**

Macabre and similar soils: 10 percent of the unit

Nivean soils that have slopes of less than 25 percent:  
5 percent of the unit  
Perma and similar soils: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2252E—Nivean, very stony-Macabre, stony-Rock outcrop complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,200 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Nivean and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Hillsides, mountain slopes  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from welded tuff  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 0.9 inch

#### Macabre and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Hillsides, mountain slopes  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly residuum derived from welded tuff  
Gravelly slope alluvium over residuum derived from welded tuff  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 2.8 inches

### Rock outcrop

*Extent:* 15 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of welded tuff, rhyolitic tuff, and/or tuffaceous volcanic rocks.

### Additional Components

Rubble land: 10 percent of the unit  
Macabre soils that have slopes of less than 15 percent: 5 percent of the unit  
Nivean soils that have slopes of more than 35 percent: 5 percent of the unit  
Perma and similar soils: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2261D—Lowland loam, 4 to 15 percent slopes, stony

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Lowland and similar soils

*Extent:* 75 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly colluvium derived from tuffaceous volcanic rocks  
Gravelly slope alluvium derived from tuffaceous volcanic rocks  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.3 inches

### Additional Components

Arrowpeak and similar soils: 10 percent of the unit  
Lowland soils that have slopes of more than 15 percent: 10 percent of the unit  
Judco and similar soils: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2261E—Lowland loam, 15 to 35 percent slopes, stony

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Lowland and similar soils

*Extent:* 75 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from tuffaceous volcanic rocks  
     Gravelly slope alluvium derived from tuffaceous volcanic rocks  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.3 inches

### Additional Components

Arrowpeak and similar soils: 10 percent of the unit  
 Lowland soils that have slopes of less than 15 percent: 10 percent of the unit  
 Judco and similar soils: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2261F—Lowland, stony-Rock outcrop-Rubble land complex, 35 to 60 percent slopes

### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### Component Description

#### Lowland and similar soils

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from tuffaceous volcanic rocks  
     Gravelly slope alluvium derived from tuffaceous volcanic rocks  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.3 inches

#### Rock outcrop

*Extent:* 15 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of welded tuff, rhyolitic tuff, and/or tuffaceous volcanic rocks.

#### Rubble land

*Extent:* 10 percent of the map unit  
*Definition:* This component consists of extensive areas of angular to subrounded, tuffaceous cobbles, stones, and boulders.

### Additional Components

Arrowpeak and similar soils: 10 percent of the unit  
 Lowland soils that have slopes of less than 35 percent: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2270F—Macabre, very stony-Rock outcrop-Rubble land complex, 35 to 60 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains  
*Elevation:* 4,500 to 6,200 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Macabre and similar soils

*Extent:* 60 percent of the map unit

*Geomorphic position:* Hillsides, mountain slopes

*Slope:* 35 to 60 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from welded tuff

Gravelly slope alluvium over residuum derived from welded tuff

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.8 inches

#### Rock outcrop

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of welded tuff, rhyolitic tuff, and/or tuffaceous volcanic rocks.

#### Rubble land

*Extent:* 10 percent of the map unit

*Definition:* This component consists of extensive areas of angular to subrounded, tuffaceous cobbles, stones, and boulders.

### Additional Components

Nivean and similar soils: 10 percent of the unit

Macabre, stony, and similar soils: 3 percent of the unit

Macabre, very gravelly, and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2271D—Macabre gravelly loam, 8 to 15 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains, uplands

*Elevation:* 4,400 to 6,200 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 80 to 95 days

### Component Description

#### Macabre and similar soils

*Extent:* 85 percent of the map unit

*Geomorphic position:* Hillsides, mountain slopes

*Slope:* 8 to 15 percent

*Surface layer texture:* Gravelly loam

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from welded tuff

Gravelly slope alluvium over residuum derived from welded tuff

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.8 inches

### Additional Components

Nivean and similar soils: 10 percent of the unit

Perma and similar soils: 3 percent of the unit

Rock outcrop: 1 percent of the unit

Rubble land: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2281F—Judco, stony-Torpy, stony-Rock outcrop complex, 35 to 60 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Judco and similar soils

*Extent:* 55 percent of the map unit

*Geomorphic position:* Divides, mountain slopes

*Slope:* 35 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Depth to restrictive feature:* 40 to 60 inches to bedrock (paralithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from welded tuff

Gravelly residuum derived from welded tuff

Gravelly slope alluvium over residuum derived from welded tuff

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.6 inches

### **Torpy and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 35 to 60 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from tuffaceous volcanic rocks

Gravelly slope alluvium derived from tuffaceous volcanic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.7 inches

### **Rock outcrop**

*Extent:* 10 percent of the map unit

*Definition:* This component consists mainly of exposed areas of welded tuff, rhyolitic tuff, and/or tuffaceous volcanic rocks.

### **Additional Components**

Arrowpeak and similar soils: 10 percent of the unit

Torpy, stony, and similar soils: 5 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2291F—Mocmont-Kadygulch cobbly loams, 35 to 60 percent slopes, very stony**

### **Map Unit Setting**

*Landscape:* Foothills, mountains

*Elevation:* 4,400 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 95 days

### **Component Description**

#### **Mocmont and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, mountain slopes, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from fine grained sandstone

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from argillaceous limestone

Gravelly slope alluvium derived from fine grained sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

### **Kadygulch and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides

*Slope:* 35 to 60 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly colluvium derived from granite

Sandy and gravelly slope alluvium derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.6 inches

### **Additional Components**

Hiore and similar soils: 5 percent of the unit

Kurrie and similar soils: 5 percent of the unit

Shaboom and similar soils: 4 percent of the unit

Rock outcrop: 3 percent of the unit

Rubble land: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2301F—Mocmont, bouldery-Roegulch, rubbly-Rock outcrop complex, 25 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, mountains, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Mocmont and similar soils**

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, mountain slopes, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from fine grained sandstone  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from argillaceous limestone  
 Gravelly slope alluvium derived from fine grained sandstone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 3.1 inches

#### **Roegulch and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Very stony loam  
*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly slope alluvium derived from granite over residuum derived from granite  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.1 inches

#### **Rock outcrop**

*Extent:* 10 percent of the map unit  
*Definition:* This component consists mainly of exposed

areas of hard, fractured, fine grained volcanic extrusive bedrock.

### **Additional Components**

Rubble land: 5 percent of the unit  
 Brickner and similar soils: 2 percent of the unit  
 Sawbuck and similar soils: 2 percent of the unit  
 Cometcrik and similar soils: 1 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2311F—Worock, stony-Cowood, very stony-Rock outcrop complex, 35 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Worock and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very gravelly sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics  
 Gravelly till derived from fine grained igneous and metamorphic rocks  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 5.2 inches

#### **Cowood and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Escarpments, mountainsides, ridges  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very channery sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

### Rock outcrop

*Extent:* 5 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

### Additional Components

Arrowpeak and similar soils: 5 percent of the unit

Elve and similar soils: 5 percent of the unit

Rubble land: 5 percent of the unit

Worock soils that have slopes of less than 35 percent: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2312F—Worock, stony-Elve, stony-Rock outcrop complex, 35 to 60 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Worock and similar soils

*Extent:* 45 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 35 to 60 percent

*Surface layer texture:* Very gravelly sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

Gravelly till derived from fine grained igneous and metamorphic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.2 inches

### Elve and similar soils

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 35 to 60 percent

*Surface layer texture:* Very gravelly sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.1 inches

### Rock outcrop

*Extent:* 5 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

### Additional Components

Cowood and similar soils: 5 percent of the unit

Rubble land: 5 percent of the unit

Worock soils that have slope of less than 35 percent: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2321D—Torpy loam, 4 to 15 percent slopes

### Map Unit Setting

*Landscape:* Mountains, foothills

*Elevation:* 4,500 to 8,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 30 to 95 days

### Component Description

#### Torpy and similar soils

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 4 to 15 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from tuffaceous volcanic rocks

Gravelly slope alluvium derived from tuffaceous volcanic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.9 inches

### Additional Components

Vitroff and similar soils: 6 percent of the unit

Nivean and similar soils: 5 percent of the unit

Rock outcrop: 4 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2321E—Torpy gravelly loam, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Torpy and similar soils

*Extent:* 90 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 15 to 35 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from tuffaceous volcanic rocks

Gravelly slope alluvium derived from tuffaceous volcanic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.7 inches

### Additional Components

Torpy soils that have slopes of more than 35 percent: 5 percent of the unit

Arrowpeak and similar soils: 3 percent of the unit

Arrowpeak, very stony, and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2321F—Torpy gravelly loam, 35 to 60 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Torpy and similar soils

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 35 to 60 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from tuffaceous volcanic rocks

Gravelly slope alluvium derived from tuffaceous volcanic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.7 inches

### Additional Components

Torpy soils that have slopes of less than 35 percent: 10 percent of the unit

Arrowpeak and similar soils: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2322E—Lowland-Torpy complex, 15 to 35 percent slopes****Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

**Component Description****Lowland and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Gravelly colluvium derived from tuffaceous volcanic rocks

Gravelly slope alluvium derived from tuffaceous volcanic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.8 inches

**Torpy and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Gravelly colluvium derived from tuffaceous volcanic rocks

Gravelly slope alluvium derived from tuffaceous volcanic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.9 inches

**Additional Components**

Arrowpeak and similar soils: 5 percent of the unit

Judco and similar soils: 5 percent of the unit

Rock outcrop: 3 percent of the unit

Rubble land: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2322F—Lowland-Torpy complex, 35 to 60 percent slopes****Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

**Component Description****Lowland and similar soils**

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Gravelly sandy clay loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Gravelly colluvium derived from tuffaceous volcanic rocks

Gravelly slope alluvium derived from tuffaceous volcanic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.8 inches

**Torpy and similar soils**

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Gravelly colluvium derived from tuffaceous volcanic rocks

Gravelly slope alluvium derived from tuffaceous volcanic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.9 inches

**Additional Components**

Arrowpeak and similar soils: 5 percent of the unit

Torpy soils that have slopes of less than 35 percent: 5 percent of the unit

Rock outcrop: 3 percent of the unit

Rubble land: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 2331B—Mooseflat loam, 1 to 4 percent slopes

#### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

#### Component Description

##### Mooseflat and similar soils

*Extent:* 80 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 1 to 4 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Very poorly drained  
*Parent material:* Organic material over fine-loamy alluvium over sandy and gravelly alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Frequent  
*Water table:* Within a depth of 60 inches  
*Ponding duration:* Brief  
*Available water capacity:* Mainly 5.4 inches

#### Additional Components

Elvick and similar soils: 10 percent of the unit  
 Libeg and similar soils: 10 percent of the unit

#### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 2332B—Mooseflat-Elvick loams, 1 to 4 percent slopes

#### Map Unit Setting

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

#### Component Description

##### Mooseflat and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 1 to 4 percent

*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Very poorly drained  
*Parent material:* Organic material over fine-loamy alluvium over sandy and gravelly alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Frequent  
*Water table:* Within a depth of 60 inches  
*Ponding duration:* Brief  
*Available water capacity:* Mainly 5.4 inches

##### Elvick and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, drainageways, flood plains, flood-plain steps  
*Slope:* 1 to 4 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Very poorly drained  
*Parent material:* Fine-loamy over sandy and gravelly recent alluvium derived from mixed igneous, sedimentary, and metamorphic rocks  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 4.4 inches

#### Additional Components

Libeg and similar soils: 15 percent

#### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 2350D—Clasoil, very stony-Sawicki, bouldery, complex, 4 to 15 percent slopes

#### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

#### Component Description

##### Clasoil and similar soils

*Extent:* 65 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Cobbly sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Fine-loamy alluvium derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 7.1 inches

### **Sawicki and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, mountain slopes

*Slope:* 4 to 15 percent

*Surface layer texture:* Cobbly sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.1 inches

### **Additional Components**

Clasoil soils that have slopes of more than 15 percent: 6 percent of the unit

Sawicki soils that have slopes of more than 15 percent: 5 percent of the unit

Bielenberg and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2360E—Gnojek, stony-Wickes, stony-Shawmut complex, 8 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, foothills

*Elevation:* 4,400 to 6,200 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Gnojek and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from sandstone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.1 inches

### **Wickes and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, interfluves, ridges

*Slope:* 8 to 25 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt over residuum derived from basalt

Gravelly colluvium over residuum derived from sandstone

Gravelly slope alluvium over residuum derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

### **Shawmut and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides

*Slope:* 8 to 15 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 5.0 inches

### **Additional Components**

Shawmut, bouldery, and similar soils: 4 percent of the unit

Absarook and similar soils: 3 percent of the unit  
Perma and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2360F—Gnojek, stony-Wickes, stony-Rock outcrop complex, 35 to 70 percent slopes

### Map Unit Setting

*Landscape:* Uplands, foothills  
*Elevation:* 4,400 to 6,200 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Gnojek and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly residuum derived from basalt  
Gravelly residuum derived from sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.1 inches

#### Wickes and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, interfluves, ridges  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Very gravelly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly colluvium derived from basalt over residuum derived from basalt  
Gravelly colluvium over residuum derived from sandstone

Gravelly slope alluvium over residuum derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.1 inches

### Rock outcrop

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

### Additional Components

Rubble land: 10 percent of the unit  
Shawmut and similar soils: 4 percent of the unit  
Absarook and similar soils: 3 percent of the unit  
Brickner and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2361E—Gnojek, stony-Wickes, stony-Rock outcrop complex, 8 to 35 percent slopes

### Map Unit Setting

*Landscape:* Uplands, foothills  
*Elevation:* 4,400 to 6,200 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Gnojek and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly residuum derived from basalt  
Gravelly residuum derived from sandstone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.1 inches

#### Wickes and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, interfluves, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt over residuum derived from basalt

Gravelly colluvium over residuum derived from sandstone

Gravelly slope alluvium over residuum derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

### **Rock outcrop**

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock. Boulders and stones make up a small part of the areas.

### **Additional Components**

Shawmut and similar soils: 4 percent of the unit

Absarook and similar soils: 3 percent of the unit

Brickner and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2361F—Gnojek, stony-Rock outcrop-Wickes, stony, complex, 25 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Uplands, foothills

*Elevation:* 4,400 to 6,200 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

### **Component Description**

#### **Gnojek and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.1 inches

### **Rock outcrop**

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock. Boulders and stones make up a small part of the areas.

### **Wickes and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, interfluves, ridges

*Slope:* 25 to 60 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt over residuum derived from basalt

Gravelly colluvium over residuum derived from sandstone

Gravelly slope alluvium over residuum derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.2 inches

### **Additional Components**

Shawmut and similar soils: 4 percent of the unit

Absarook and similar soils: 3 percent of the unit

Brickner and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 2391C—Marcel, very bouldery-Tibkey, bouldery, complex, 2 to 8 percent slopes

#### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

#### Component Description

##### Marcel and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 2 to 8 percent

*Surface layer texture:* Gravelly silt loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Somewhat poorly drained

*Parent material:*

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

Gravelly alpine till

*Native plant cover type:* Rangeland

*Flooding:* None

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 7.8 inches

##### Tibkey and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 2 to 8 percent

*Surface layer texture:* Mucky silt loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Somewhat poorly drained

*Parent material:*

Gravelly slope alluvium derived from basalt

Gravelly till derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 6.8 inches

#### Additional Components

Sebud and similar soils: 6 percent of the unit

Libeg and similar soils: 5 percent of the unit

Monaberg and similar soils: 5 percent of the unit

Elvick and similar soils: 4 percent of the unit

#### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 2411E—Ashbray, bouldery-Rock outcrop-Rubble land complex, 8 to 45 percent slopes

#### Map Unit Setting

*Landscape:* Foothills, mountains, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

#### Component Description

##### Ashbray and similar soils

*Extent:* 45 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 8 to 45 percent

*Surface layer texture:* Gravelly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Somewhat excessively drained

*Parent material:* Sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.0 inch

##### Rock outcrop

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock.

##### Rubble land

*Extent:* 20 percent of the map unit

*Definition:* This component consists of areas of hard, rounded granite cobbles, stones, and boulders.

#### Additional Components

Baxton and similar soils: 5 percent of the unit

Elmark and similar soils: 4 percent of the unit

Catgulch and similar soils: 3 percent of the unit

Connieo and similar soils: 3 percent of the unit

#### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2412F—Ashbray, rubbly-Rock outcrop-  
Kellygulch, very stony, complex, 35 to  
70 percent slopes**

**Map Unit Setting**

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 80 to 95 days

**Component Description**

**Ashbray and similar soils**

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Stony coarse sandy loam  
*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:*

Sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.0 inch

**Rock outcrop**

*Extent:* 15 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock.

**Kellygulch and similar soils**

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 35 to 70 percent  
*Surface layer texture:* Very cobbly sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy colluvium over residuum derived from granite

Coarse-loamy residuum derived from granite

Coarse-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.8 inches

**Additional Components**

Rubble land: 15 percent of the unit  
Connieo and similar soils: 4 percent of the unit  
Catgulch and similar soils: 3 percent of the unit  
Elmark and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2421E—Surdal, stony-Arrowpeak, very  
stony, complex, 4 to 25 percent slopes**

**Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 8,000 feet  
*Mean annual precipitation:* 15 to 30 inches  
*Frost-free period:* 30 to 70 days

**Component Description**

**Surdal and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Escarpments, mountain slopes, ridges  
*Slope:* 4 to 25 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*

Gravelly colluvium over residuum derived from basalt

Gravelly slope alluvium derived from basalt over residuum derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.4 inches

**Arrowpeak and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Mountain slopes, ridges  
*Slope:* 4 to 25 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly colluvium over residuum derived from basalt

Gravelly residuum derived from tuffaceous volcanic rock

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.8 inches

### **Additional Components**

Sebud and similar soils: 8 percent of the unit

Tibkey and similar soils: 7 percent of the unit

Nieman and similar soils: 4 percent of the unit

Monaberg and similar soils: 3 percent of the unit

Rock outcrop: 3 percent of the unit

Rubble land: 3 percent of the unit

Libeg and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2431C—Foolhen, stony-Tibkey, bouldery, complex, 0 to 8 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Foolhen and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Flood plains, flood-plain steps

*Slope:* 0 to 4 percent

*Surface layer texture:* Mucky loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Very poorly drained

*Parent material:* Organic, herbaceous material over fine-loamy alluvium

*Native plant cover type:* Rangeland

*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 7.6 inches

#### **Tibkey and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 2 to 8 percent

*Surface layer texture:* Cobbly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Somewhat poorly drained

*Parent material:*

Gravelly slope alluvium derived from basalt

Gravelly till derived from basalt

*Native plant cover type:* Rangeland

*Flooding:* None

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 6.3 inches

### **Additional Components**

Sebud and similar soils: 5 percent of the unit

Marcel and similar soils: 4 percent of the unit

Elvick and similar soils: 2 percent of the unit

Lowder and similar soils: 2 percent of the unit

Monaberg and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2441E—Tineman, very stony-Franconi, bouldery-Rock outcrop complex, 4 to 25 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Tineman and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Moraines, mountain slopes, mountain valleys

*Slope:* 4 to 25 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Gravelly alluvium over sandy and gravelly recent alluvium derived from igneous, sedimentary, and metamorphic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 6.2 inches

### **Franconi and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, ridges

*Slope:* 4 to 25 percent

*Surface layer texture:* Gravelly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium over residuum derived from granite

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.7 inches

### **Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### **Additional Components**

Caseypeak and similar soils: 4 percent of the unit

Worock and similar soils: 4 percent of the unit

Elvick and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2450E—Kounter, bouldery-Rock outcrop-Cedric, bouldery, complex, 8 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, uplands, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 12 to 19 inches

*Frost-free period:* 80 to 95 days

## **Component Description**

### **Kounter and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Hillsides, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Cobbly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Somewhat excessively drained

*Parent material:* Sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 0.8 inch

### **Rock outcrop**

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### **Cedric and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Divides, hills, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Loamy residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.4 inches

### **Additional Components**

Burtoner and similar soils: 4 percent of the unit

Jeffcity and similar soils: 3 percent of the unit

Placerton and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2451D—Kounter, bouldery-Rock outcrop-  
Cedric, bouldery, complex, 4 to 25  
percent slopes, dry**

**Map Unit Setting**

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 12 to 19 inches  
*Frost-free period:* 80 to 95 days

**Component Description**

**Kounter and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Hillsides, ridges  
*Slope:* 4 to 25 percent  
*Surface layer texture:* Cobbly coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:* Sandy and gravelly residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 0.8 inch

**Rock outcrop**

*Extent:* 30 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

**Cedric and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Divides, hills, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Loamy residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.4 inches

**Additional Components**

Jeffcity and similar soils: 5 percent of the unit  
Placerton and similar soils: 4 percent of the unit

Breeton and similar soils: 3 percent of the unit  
Burtoner and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2452E—Kounter, very bouldery-Rock  
outcrop-Jeffcity, bouldery, complex, 15  
to 35 percent slopes**

**Map Unit Setting**

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 12 to 19 inches  
*Frost-free period:* 80 to 95 days

**Component Description**

**Kounter and similar soils**

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very cobbly coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Parent material:* Sandy and gravelly residuum derived from granite  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 0.8 inch

**Rock outcrop**

*Extent:* 30 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

**Jeffcity and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Escarpments, hillsides, ridges  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Coarse sandy loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained

*Parent material:*

Fine-loamy residuum derived from granite  
 Fine-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 3.4 inches**Additional Components**

Cedric and similar soils: 4 percent of the unit  
 Breeton and similar soils: 3 percent of the unit  
 Placerton and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **2460D—Cedric, bouldery-Jeffcity, bouldery-Rock outcrop complex, 2 to 15 percent slopes**

**Map Unit Setting***Landscape:* Foothills, uplands, mountains*Elevation:* 4,400 to 6,000 feet*Mean annual precipitation:* 12 to 19 inches*Frost-free period:* 80 to 95 days**Component Description****Cedric and similar soils***Extent:* 35 percent of the map unit*Geomorphic position:* Divides, hills, ridges*Slope:* 2 to 15 percent*Surface layer texture:* Coarse sandy loam*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)*Drainage class:* Well drained*Parent material:* Loamy residuum derived from granite*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 1.4 inches**Jeffcity and similar soils***Extent:* 30 percent of the map unit*Geomorphic position:* Escarpments, hillsides, ridges*Slope:* 2 to 15 percent*Surface layer texture:* Coarse sandy loam*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)*Drainage class:* Well drained*Parent material:*

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 3.4 inches**Rock outcrop***Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

**Additional Components**

Kounter and similar soils: 4 percent of the unit  
 Martinsdale and similar soils: 3 percent of the unit  
 Placerton and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **2461D—Cedric, bouldery-Rock outcrop-Jeffcity, bouldery, complex, 2 to 15 percent slopes**

**Map Unit Setting***Landscape:* Foothills, uplands, mountains*Elevation:* 4,400 to 6,000 feet*Mean annual precipitation:* 12 to 19 inches*Frost-free period:* 80 to 95 days**Component Description****Cedric and similar soils***Extent:* 40 percent of the map unit*Geomorphic position:* Divides, hills, ridges*Slope:* 2 to 15 percent*Surface layer texture:* Coarse sandy loam*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)*Drainage class:* Well drained*Parent material:* Loamy residuum derived from granite*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.4 inches

### **Rock outcrop**

*Extent:* 30 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### **Jeffcity and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 2 to 15 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Fine-loamy residuum derived from granite

Fine-loamy slope alluvium over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.4 inches

### **Additional Components**

Kounter and similar soils: 4 percent of the unit

Catgulch and similar soils: 2 percent of the unit

Martinsdale and similar soils: 2 percent of the unit

Placerton and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2471F—Elve, stony-Worock, stony-Rock outcrop complex, 35 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,000 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Elve and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 35 to 60 percent

*Surface layer texture:* Loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.6 inches

#### **Worock and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 35 to 60 percent

*Surface layer texture:* Loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

Gravelly till derived from fine grained igneous and metamorphic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.7 inches

#### **Rock outcrop**

*Extent:* 20 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock. Boulders and stones make up a small part of the areas.

### **Additional Components**

Cowood and similar soils: 3 percent of the unit

Hapgood and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2472E—Elvick-Lowder complex, 8 to 25 percent slopes, very bouldery

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Elvick and similar soils

*Extent:* 55 percent of the map unit

*Geomorphic position:* Alluvial fans, drainageways

*Slope:* 8 to 25 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Somewhat poorly drained

*Parent material:* Gravelly slope alluvium derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 4.0 inches

#### Lowder and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, flood-plain steps, recessional moraines, swales

*Slope:* 8 to 25 percent

*Surface layer texture:* Very stony loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Very poorly drained

*Parent material:*

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

Gravelly till derived from metavolcanics

*Native plant cover type:* Forest land

*Flooding:* None

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 4.7 inches

### Additional Components

Elve and similar soils: 5 percent of the unit

Worock and similar soils: 4 percent of the unit

Marcel and similar soils: 3 percent of the unit

Sebud and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2473E—Elve-Cowood very cobbly loams, 8 to 35 percent slopes, very stony

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 6,500 to 8,500 feet

*Mean annual precipitation:* 20 to 30 inches

*Frost-free period:* 30 to 60 days

### Component Description

#### Elve and similar soils

*Extent:* 60 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 8 to 35 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.2 inches

#### Cowood and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Escarpments, mountainsides, ridges

*Slope:* 8 to 35 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt  
Gravelly residuum derived from sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.0 inch

**Additional Components**

Arrowpeak and similar soils: 5 percent of the unit

Worock and similar soils: 4 percent of the unit

Rock outcrop: 3 percent of the unit

Rubble land: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2481F—Brickner, very bouldery-Rock outcrop-Rubble land complex, 15 to 60 percent slopes****Map Unit Setting**

*Landscape:* Foothills, uplands, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

**Component Description****Brickner and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 15 to 60 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt  
Gravelly residuum derived from sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.1 inches

**Rock outcrop**

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

**Rubble land**

*Extent:* 25 percent of the map unit

*Definition:* This component consists of extensive areas of hard, fine grained, angular volcanic cobbles, stones, and boulders.

**Additional Components**

Blaincreek and similar soils: 6 percent of the unit

Hilger and similar soils: 4 percent of the unit

Mocmont and similar soils: 4 percent of the unit

Sawicki and similar soils: 3 percent of the unit

Tolbert and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2483F—Elve, rubbly-Rock outcrop-Rubble land association, 25 to 60 percent slopes, cool****Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 8,500 feet

*Mean annual precipitation:* 15 to 30 inches

*Frost-free period:* 30 to 70 days

**Component Description****Elve and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 25 to 60 percent

*Surface layer texture:* Very stony loam

*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from basalt  
Gravelly slope alluvium derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.2 inches

**Rock outcrop**

*Extent:* 30 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

**Rubble land**

*Extent:* 25 percent of the map unit

*Definition:* This component consists of extensive areas

of hard, fine grained, angular volcanic cobbles, stones, and boulders.

### **Additional Components**

Worock and similar soils: 6 percent of the unit

Cowood and similar soils: 5 percent of the unit

Redfern and similar soils: 4 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2484F—Rock outcrop-Rubble land-Redfern, rubbly, association, 35 to 70 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Rock outcrop**

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

#### **Rubble land**

*Extent:* 25 percent of the map unit

*Definition:* This component consists of extensive areas of hard, fine grained, angular volcanic cobbles, stones, and boulders.

#### **Redfern and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Divides, escarpments, mountain slopes, ridges

*Slope:* 35 to 70 percent

*Surface layer texture:* Very stony loam

*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

### **Additional Components**

Helmville and similar soils: 15 percent of the unit

Worock and similar soils: 5 percent of the unit

Elve and similar soils: 4 percent of the unit

Cowood and similar soils: 3 percent of the unit

Tigeron and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2485F—Redfern, rubbly-Rock outcrop-Tigeron, very bouldery, association, 25 to 70 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Redfern and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Divides, escarpments, mountain slopes, ridges

*Slope:* 25 to 70 percent

*Surface layer texture:* Very stony loam

*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.3 inches

#### **Rock outcrop**

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

#### **Tigeron and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, ridges, saddles

*Slope:* 25 to 50 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.0 inches

**Additional Components**

Rubble land: 20 percent of the unit  
 Elve and similar soils: 4 percent of the unit  
 Cowood and similar soils: 3 percent of the unit  
 Worock and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2486F—Elve, rubbly-Rock outcrop-Rubble land complex, 35 to 60 percent slopes****Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

**Component Description****Elve and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very stony loam  
*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 2.2 inches

**Rock outcrop**

*Extent:* 25 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

**Rubble land**

*Extent:* 25 percent of the map unit

*Definition:* This component consists of extensive areas of hard, fine grained, angular volcanic cobbles, stones, and boulders.

**Additional Components**

Tigeron and similar soils: 7 percent of the unit  
 Redfern and similar soils: 6 percent of the unit  
 Cowood and similar soils: 4 percent of the unit  
 Helmville and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2487F—Torpy, rubbly-Rock outcrop-Rubble land complex, 35 to 60 percent slopes****Map Unit Setting**

*Landscape:* Mountains, foothills

*Elevation:* 4,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 95 days

**Component Description****Torpy and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Stony loam  
*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from tuffaceous volcanic rocks  
 Gravelly slope alluvium derived from tuffaceous volcanic rocks  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 5.8 inches

**Rock outcrop**

*Extent:* 30 percent of the map unit  
*Definition:* This component consists mainly of exposed areas of welded tuff, rhyolitic tuff, and/or tuffaceous volcanic rocks.

**Rubble land**

*Extent:* 25 percent of the map unit

*Definition:* This component consists of extensive areas of angular to subrounded, tuffaceous cobbles, stones, and boulders.

**Additional Components**

Nivean and similar soils: 5 percent of the unit

Lowland and similar soils: 4 percent of the unit

Arrowpeak and similar soils: 3 percent of the unit

Macabre and similar soils: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2488D—Elve, very stony-Rock outcrop-Rubble land complex, 4 to 35 percent slopes****Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

**Component Description****Elve and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 4 to 35 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.2 inches

**Rock outcrop**

*Extent:* 25 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

**Rubble land**

*Extent:* 20 percent of the map unit

*Definition:* This component consists of extensive areas

of hard, fine grained, angular volcanic cobbles, stones, and boulders.

**Additional Components**

Elvick and similar soils: 15 percent of the unit

Worock and similar soils: 3 percent of the unit

Redfern and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2501D—Lowder-Elvick very cobbly loams, 2 to 15 percent slopes, very bouldery****Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

**Component Description****Lowder and similar soils**

*Extent:* 60 percent of the map unit

*Geomorphic position:* Alluvial fans, flood-plain steps, recessional moraines, swales

*Slope:* 2 to 8 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Very poorly drained

*Parent material:*

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

Gravelly till derived from metavolcanics

*Native plant cover type:* Forest land

*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 4.7 inches

**Elvick and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, drainageways

*Slope:* 2 to 15 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Somewhat poorly drained

*Parent material:* Gravelly slope alluvium derived from basalt

*Native plant cover type:* Forest land

*Flooding:* None

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 4.0 inches

### Additional Components

Worock and similar soils: 5 percent of the unit

Sebud and similar soils: 3 percent of the unit

Foolhen and similar soils: 2 percent of the unit

Rock outcrop: 2 percent of the unit

Tibkey and similar soils: 2 percent of the unit

Rubble land: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2511C—Monaberg loam, 2 to 8 percent slopes, bouldery

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### Component Description

#### Monaberg and similar soils

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 2 to 8 percent

*Surface layer texture:* Loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy slope alluvium derived from basalt

Fine-loamy slope alluvium derived from fine grained igneous and metamorphic rocks

Fine-loamy alpine till derived from fine grained igneous and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 8.8 inches

### Additional Components

Sebud and similar soils: 5 percent of the unit

Marcel and similar soils: 4 percent of the unit

Libeg and similar soils: 3 percent of the unit

Tibkey and similar soils: 3 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2581E—Worock, very bouldery-Elve, very stony, complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Mountains

*Elevation:* 6,000 to 8,000 feet

*Mean annual precipitation:* 20 to 30 inches

*Frost-free period:* 30 to 60 days

### Component Description

#### Worock and similar soils

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 15 to 35 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

Gravelly till derived from fine grained igneous and metamorphic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.2 inches

#### Elve and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 15 to 35 percent

*Surface layer texture:* Very cobbly loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 2.2 inches

### **Additional Components**

Tepecreek and similar soils: 4 percent of the unit  
 Warwood and similar soils: 3 percent of the unit  
 Rock outcrop: 2 percent of the unit  
 Rubble land: 1 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2582D—Worock-Elve very cobbly loams, 2 to 15 percent slopes, very bouldery, cool**

### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 6,000 to 8,000 feet  
*Mean annual precipitation:* 20 to 30 inches  
*Frost-free period:* 30 to 60 days

### **Component Description**

#### **Worock and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics  
 Gravelly till derived from fine grained igneous and metamorphic rocks

*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 5.2 inches

#### **Elve and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 2 to 15 percent

*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Somewhat excessively drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly slope alluvium derived from basalt  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 2.2 inches

### **Additional Components**

Tepecreek and similar soils: 6 percent of the unit  
 Warwood and similar soils: 4 percent of the unit  
 Rock outcrop: 3 percent of the unit  
 Rubble land: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2582E—Worock, very bouldery-Worock, rubbly, complex, 8 to 35 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 8,500 feet  
*Mean annual precipitation:* 15 to 30 inches  
*Frost-free period:* 30 to 70 days

### **Component Description**

#### **Worock, very bouldery, and similar soils**

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 8 to 35 percent  
*Surface layer texture:* Very stony loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics  
 Gravelly till derived from fine grained igneous and metamorphic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.8 inches

### **Worock, rubbly, and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 8 to 35 percent

*Surface layer texture:* Extremely stony loam

*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

Gravelly till derived from fine grained igneous and metamorphic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.7 inches

### **Additional Components**

Elve and similar soils: 6 percent of the unit

Cowood and similar soils: 5 percent of the unit

Tigeron and similar soils: 4 percent of the unit

Rock outcrop: 3 percent of the unit

Rubble land: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2582F—Worock, rubbly-Rock outcrop-Rubble land complex, 35 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 6,500 to 8,500 feet

*Mean annual precipitation:* 20 to 30 inches

*Frost-free period:* 30 to 60 days

### **Component Description**

#### **Worock and similar soils**

*Extent:* 55 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 35 to 60 percent

*Surface layer texture:* Extremely stony loam

*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly colluvium derived from metavolcanics

Gravelly slope alluvium derived from basalt

Gravelly slope alluvium derived from metavolcanics

Gravelly till derived from fine grained igneous and metamorphic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.7 inches

### **Rock outcrop**

*Extent:* 15 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, fractured, fine grained volcanic extrusive bedrock.

### **Rubble land**

*Extent:* 15 percent of the map unit

*Definition:* This component consists of extensive areas of hard, fine grained, angular volcanic cobbles, stones, and boulders.

### **Additional Components**

Elve and similar soils: 8 percent of the unit

Cowood and similar soils: 7 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2583D—Worock, stony-Worock, very bouldery, complex, 2 to 15 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Worock, stony, and similar soils**

*Extent:* 45 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 2 to 15 percent  
*Surface layer texture:* Cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics  
 Gravelly till derived from fine grained igneous and metamorphic rocks  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 5.7 inches

#### **Worock, very bouldery, and similar soils**

*Extent:* 30 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 2 to 15 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics  
 Gravelly till derived from fine grained igneous and metamorphic rocks  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 5.2 inches

#### **Additional Components**

Tibkey and similar soils: 7 percent of the unit  
 Sebud and similar soils: 6 percent of the unit  
 Elvick and similar soils: 5 percent of the unit  
 Elve and similar soils: 4 percent of the unit  
 Tigeron and similar soils: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **2583F—Worock, very bouldery-Worock, rubbly, complex, 35 to 60 percent slopes**

#### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 8,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

#### **Component Description**

##### **Worock, very bouldery, and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics  
 Gravelly till derived from fine grained igneous and metamorphic rocks  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 5.2 inches

##### **Worock, rubbly, and similar soils**

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very stony loam  
*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics  
 Gravelly till derived from fine grained igneous and metamorphic rocks

*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 4.8 inches

### **Additional Components**

Elve and similar soils: 7 percent of the unit  
 Rock outcrop: 7 percent of the unit  
 Tepecreek and similar soils: 6 percent of the unit  
 Tibkey and similar soils: 4 percent of the unit  
 Cowood and similar soils: 3 percent of the unit  
 Tigeron and similar soils: 3 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2584E—Worock, very bouldery-Worock, rubbly, complex, 15 to 45 percent slopes, dry**

### **Map Unit Setting**

*Landscape:* Mountains  
*Elevation:* 5,500 to 7,500 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Worock, very bouldery, and similar soils**

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics  
 Gravelly till derived from fine grained igneous and metamorphic rocks

*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 5.2 inches

#### **Worock, rubbly, and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Very stony loam  
*Percent of surface covered by rock fragments:* 15 to 50 percent (boulders)  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*

Gravelly colluvium derived from basalt  
 Gravelly colluvium derived from metavolcanics  
 Gravelly slope alluvium derived from basalt  
 Gravelly slope alluvium derived from metavolcanics  
 Gravelly till derived from fine grained igneous and metamorphic rocks

*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 4.8 inches

### **Additional Components**

Elve and similar soils: 6 percent of the unit  
 Cowood and similar soils: 5 percent of the unit  
 Rock outcrop: 3 percent of the unit  
 Rubble land: 3 percent of the unit  
 Redfern and similar soils: 3 percent of the unit  
 Tigeron and similar soils: 3 percent of the unit  
 Helmville and similar soils: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2591F—Kadygulch-Roegulch, stony, complex, 35 to 60 percent slopes**

### **Map Unit Setting**

*Landscape:* Foothills, mountains  
*Elevation:* 4,400 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 105 days

### **Component Description**

#### **Kadygulch and similar soils**

*Extent:* 70 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained

*Parent material:*

Sandy and gravelly colluvium derived from granite

Sandy and gravelly slope alluvium derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.6 inches

**Roegulch and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Gravelly loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:* Gravelly slope alluvium derived from granite over residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 1.1 inches

**Additional Components**

Breton and similar soils: 7 percent of the unit

Yreka and similar soils: 5 percent of the unit

Rock outcrop: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2661F—Elve-Cowood complex, 45 to 70 percent slopes****Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

**Component Description****Elve and similar soils**

*Extent:* 65 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 45 to 70 percent

*Surface layer texture:* Very gravelly sandy loam

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Flooding:* None

*Available water capacity:* Mainly 2.3 inches

**Cowood and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Escarpments, mountainsides, ridges

*Slope:* 45 to 70 percent

*Surface layer texture:* Very channery sandy loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

**Additional Components**

Worock and similar soils: 5 percent of the unit

Elvick and similar soils: 4 percent of the unit

Rock outcrop: 3 percent of the unit

Rubble land: 3 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2662E—Elve-Cowood complex, 15 to 45 percent slopes****Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 6,000 to 8,000 feet

*Mean annual precipitation:* 20 to 30 inches

*Frost-free period:* 30 to 60 days

**Component Description****Elve and similar soils**

*Extent:* 70 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys

*Slope:* 15 to 45 percent

*Surface layer texture:* Very gravelly sandy loam

*Restrictive feature:* None noted

*Drainage class:* Somewhat excessively drained

*Parent material:*

Gravelly colluvium derived from basalt

Gravelly slope alluvium derived from basalt

*Flooding:* None

*Available water capacity:* Mainly 2.3 inches

#### **Cowood and similar soils**

*Extent:* 15 percent of the map unit

*Geomorphic position:* Escarpments, mountainsides, ridges

*Slope:* 15 to 45 percent

*Surface layer texture:* Very channery sandy loam

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

*Drainage class:* Well drained

*Parent material:*

Gravelly residuum derived from basalt

Gravelly residuum derived from sandstone

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

#### **Additional Components**

Worock and similar soils: 5 percent of the unit

Warwood and similar soils: 4 percent of the unit

Rock outcrop: 3 percent of the unit

Rubble land: 3 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **2681E—Sawbuck-Catgulch, stony, complex, 8 to 45 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, uplands

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 105 days

#### **Component Description**

##### **Sawbuck and similar soils**

*Extent:* 65 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, mountain slopes

*Slope:* 15 to 45 percent

*Surface layer texture:* Gravelly sandy loam

*Depth to restrictive feature:* 46 to 60 inches to bedrock (paralithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt over residuum derived from granite

Gravelly colluvium derived from granite over residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.4 inches

#### **Catgulch and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs

*Slope:* 8 to 15 percent

*Surface layer texture:* Gravelly sandy loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from granite

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

#### **Additional Components**

Crackerville and similar soils: 6 percent of the unit

Sawicki and similar soils: 4 percent of the unit

Bielenberg and similar soils: 3 percent of the unit

Rock outcrop: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **2682E—Sawbuck, stony-Yreka, stony-Catgulch, very stony, complex, 15 to 45 percent slopes**

#### **Map Unit Setting**

*Landscape:* Foothills, mountains

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 90 to 105 days

#### **Component Description**

##### **Sawbuck and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, mountain slopes

*Slope:* 15 to 45 percent

*Surface layer texture:* Very gravelly sandy clay loam

*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)

*Depth to restrictive feature:* 46 to 60 inches to bedrock (paralithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from basalt over  
residuum derived from granite  
Gravelly colluvium derived from granite over  
residuum derived from granite

*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 4.4 inches**Yreka and similar soils***Extent:* 20 percent of the map unit*Geomorphic position:* Alluvial fans, hillsides, mountain slopes, ridges*Slope:* 30 to 45 percent*Surface layer texture:* Gravelly coarse sandy loam*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)*Restrictive feature:* None noted*Drainage class:* Well drained*Parent material:* Gravelly colluvium derived from mixed, fine grained igneous, sedimentary, and metamorphic rocks*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 6.9 inches**Catgulch and similar soils***Extent:* 15 percent of the map unit*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs*Slope:* 15 to 45 percent*Surface layer texture:* Gravelly coarse sandy loam*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)*Drainage class:* Well drained*Parent material:* Gravelly residuum derived from granite*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 0.9 inch**Additional Components**

Yreka soils that have slopes of more than 45 percent:  
6 percent of the unit

Skyview and similar soils: 4 percent of the unit

Hoyt and similar soils: 3 percent of the unit

Rock outcrop: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2691F—Connieo, very stony-Crackerville, stony-Rock outcrop complex, 35 to 60 percent slopes****Map Unit Setting***Landscape:* Foothills, uplands*Elevation:* 4,400 to 6,000 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 80 to 105 days**Component Description****Connieo and similar soils***Extent:* 40 percent of the map unit*Geomorphic position:* Escarpments, hillsides, ridges*Slope:* 35 to 60 percent*Surface layer texture:* Gravelly coarse sandy loam*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)*Drainage class:* Well drained*Parent material:* Loamy residuum derived from granite*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 1.6 inches**Crackerville and similar soils***Extent:* 35 percent of the map unit*Geomorphic position:* Escarpments, hillsides, ridges*Slope:* 35 to 60 percent*Surface layer texture:* Gravelly coarse sandy loam*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)*Drainage class:* Well drained*Parent material:*

Gravelly colluvium derived from granite over sandy  
and gravelly residuum derived from granite  
Gravelly residuum derived from granite  
Gravelly slope alluvium derived from granite over  
sandy and gravelly residuum derived from  
granite

*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 1.9 inches**Rock outcrop***Extent:* 10 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus)

covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Bielenberg and similar soils: 5 percent of the unit  
Clancy and similar soils: 4 percent of the unit  
Ashbray and similar soils: 2 percent of the unit  
Breeton and similar soils: 2 percent of the unit  
Burtoner and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2695E—Macabre-Nivean complex, 15 to 35 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains  
*Elevation:* 4,500 to 6,200 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 80 to 95 days

### Component Description

#### Macabre and similar soils

*Extent:* 75 percent of the map unit  
*Geomorphic position:* Hillsides, mountain slopes  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very gravelly sandy clay loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly residuum derived from welded tuff  
Gravelly slope alluvium over residuum derived from welded tuff  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 2.8 inches

#### Nivean and similar soils

*Extent:* 10 percent of the map unit  
*Geomorphic position:* Hillsides, mountain slopes  
*Slope:* 15 to 35 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:* Gravelly residuum derived from welded tuff

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

### Additional Components

Rock outcrop: 5 percent of the unit  
Rubble land: 5 percent of the unit  
Macabre soils that have slopes of more than 35 percent: 3 percent of the unit  
Nivean soils that have slopes of more than 35 percent: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 2695F—Macabre-Judco-Rock outcrop complex, 35 to 60 percent slopes

### Map Unit Setting

*Landscape:* Foothills, mountains  
*Elevation:* 4,500 to 7,000 feet  
*Mean annual precipitation:* 15 to 24 inches  
*Frost-free period:* 50 to 95 days

### Component Description

#### Macabre and similar soils

*Extent:* 75 percent of the map unit  
*Geomorphic position:* Hillsides, mountain slopes  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very gravelly sandy clay loam  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly residuum derived from welded tuff  
Gravelly slope alluvium over residuum derived from welded tuff  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 2.8 inches

#### Judco and similar soils

*Extent:* 5 percent of the map unit  
*Geomorphic position:* Divides, mountain slopes  
*Slope:* 35 to 60 percent  
*Surface layer texture:* Very cobbly loam  
*Percent of surface covered by rock fragments:* 0.01 to 0.10 percent (stones)  
*Depth to restrictive feature:* 40 to 60 inches to bedrock (paralithic)  
*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over residuum derived from welded tuff

Gravelly residuum derived from welded tuff

Gravelly slope alluvium over residuum derived from welded tuff

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 3.6 inches

**Rock outcrop**

*Extent:* 5 percent of the map unit

*Definition:* This component consists mainly of exposed areas of welded tuff, rhyolitic tuff, and/or tuffaceous volcanic rocks.

**Additional Components**

Macabre, stony, and similar soils: 5 percent of the unit

Nivean and similar soils: 5 percent of the unit

Rubble land: 5 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2701F—Crampton-Catgulch complex, 35 to 60 percent slopes, very stony****Map Unit Setting**

*Landscape:* Foothills

*Elevation:* 4,400 to 6,000 feet

*Mean annual precipitation:* 15 to 19 inches

*Frost-free period:* 80 to 95 days

**Component Description****Crampton and similar soils**

*Extent:* 70 percent of the map unit

*Geomorphic position:* Escarpments, hills, ridges

*Slope:* 35 to 60 percent

*Surface layer texture:* Coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic); 40 to 60 inches to bedrock (lithic)

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium over sandy and gravelly residuum derived from granite

Gravelly residuum derived from granite

Gravelly slope alluvium over sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 2.3 inches

**Catgulch and similar soils**

*Extent:* 20 percent of the map unit

*Geomorphic position:* Divides, escarpments, hillsides, ridges, spurs

*Slope:* 35 to 60 percent

*Surface layer texture:* Gravelly coarse sandy loam

*Percent of surface covered by rock fragments:* 0.10 to 3.00 percent (stones)

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 0.9 inch

**Additional Components**

Burtoner and similar soils: 3 percent of the unit

Kellygulch and similar soils: 3 percent of the unit

Rock outcrop: 2 percent of the unit

Shaboom and similar soils: 2 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**2705F—Vitroff-Torpy loams, 35 to 60 percent slopes****Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,000 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

**Component Description****Vitroff and similar soils**

*Extent:* 55 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, saddles

*Slope:* 35 to 60 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy colluvium derived from tuffaceous volcanic rock

Fine-loamy slope alluvium derived from tuffaceous volcanic rock

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.9 inches

### **Torpy and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes

*Slope:* 35 to 60 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly colluvium derived from tuffaceous volcanic rocks

Gravelly slope alluvium derived from tuffaceous volcanic rocks

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 5.9 inches

### **Additional Components**

Judco and similar soils: 10 percent of the unit

Rock outcrop: 2 percent of the unit

Vitroff soils that have slopes of 18 to 25 percent: 2 percent of the unit

Rubble land: 1 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2711E—Libeg very gravelly loam, 15 to 45 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 8,000 feet

*Mean annual precipitation:* 15 to 30 inches

*Frost-free period:* 30 to 70 days

### **Component Description**

#### **Libeg and similar soils**

*Extent:* 85 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces

*Slope:* 15 to 45 percent

*Surface layer texture:* Very gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly alluvium

Gravelly colluvium

Gravelly slope alluvium

Gravelly till

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 4.3 inches

### **Additional Components**

Arrowpeak and similar soils: 10 percent of the unit

Elve and similar soils: 5 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **2712D—Libeg-Mooseflat loams, 4 to 25 percent slopes**

### **Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,500 to 7,500 feet

*Mean annual precipitation:* 15 to 24 inches

*Frost-free period:* 50 to 70 days

### **Component Description**

#### **Libeg and similar soils**

*Extent:* 60 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, mountain valleys, outwash terraces

*Slope:* 4 to 25 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly alluvium

Gravelly colluvium

Gravelly slope alluvium

Gravelly till

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.9 inches

#### **Mooseflat and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Drainageways, flood plains, flood-plain steps

*Slope:* 4 to 8 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Very poorly drained  
*Parent material:* Organic material over fine-loamy alluvium over sandy and gravelly alluvium  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Frequent  
*Water table:* Within a depth of 60 inches  
*Available water capacity:* Mainly 5.4 inches

#### **Additional Components**

Libeg, very gravelly: 10 percent of the unit  
 Marcel and similar soils: 5 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **3001B—Aridic Ustifluvents, 0 to 4 percent slopes**

#### **Map Unit Setting**

*Landscape:* Valleys, river valleys  
*Elevation:* 3,500 to 4,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 90 to 120 days

#### **Component Description**

##### **Aridic Ustifluvents and similar soils**

*Extent:* 90 percent of the map unit  
*Geomorphic position:* Drainageways, flood plains, flood-plain steps  
*Slope:* 0 to 4 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Native plant cover type:* Rangeland  
*Frequency of flooding:* Rare  
*Available water capacity:* Mainly 4.7 inches

#### **Additional Components**

Rivra and similar soils: 4 percent of the unit  
 Ryell and similar soils: 4 percent of the unit  
 Fairway and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **3033B—Sappington-Amesha loams, 1 to 4 percent slopes**

#### **Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,800 to 4,300 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 105 to 120 days

#### **Component Description**

##### **Sappington and similar soils**

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 1 to 4 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, coarse-loamy Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.2 inches

##### **Amesha and similar soils**

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 1 to 4 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, coarse-loamy Tertiary valley fill alluvium  
     Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.2 inches

#### **Additional Components**

Sappington soils that have slopes of more than 4 percent: 3 percent of the unit  
 Musselshell and similar soils: 2 percent of the unit

#### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### **3033C—Sappington-Amesha loams, 4 to 8 percent slopes**

#### **Map Unit Setting**

*Landscape:* Uplands, valleys  
*Elevation:* 3,800 to 4,300 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 105 to 120 days

### Component Description

#### Sappington and similar soils

*Extent:* 50 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 4 to 8 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:* Calcareous, coarse-loamy Tertiary valley fill alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 8.2 inches

#### Amesha and similar soils

*Extent:* 40 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, knolls, plains  
*Slope:* 4 to 8 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Calcareous, coarse-loamy Tertiary valley fill alluvium  
     Calcareous, gravelly colluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 9.2 inches

### Additional Components

Amesha soils that have slopes of more than 8 percent: 4 percent of the unit  
 Sappington, gravelly, and similar soils: 4 percent of the unit  
 Crago and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 3061E—Holter-Castner channery loams, 8 to 45 percent slopes

#### Map Unit Setting

*Landscape:* Foothills, uplands, mountains  
*Elevation:* 4,500 to 6,000 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 110 days

### Component Description

#### Holter and similar soils

*Extent:* 60 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides  
*Slope:* 8 to 45 percent  
*Surface layer texture:* Channery loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from basalt  
     Gravelly colluvium derived from argillaceous limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 5.2 inches

#### Castner and similar soils

*Extent:* 25 percent of the map unit  
*Geomorphic position:* Hills, hillsides, ridges  
*Slope:* 8 to 45 percent  
*Surface layer texture:* Channery loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly residuum derived from basalt  
     Gravelly residuum derived from fine grained sandstone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.2 inches

### Additional Components

Castner soils that have slopes of more than 45 percent: 5 percent of the unit  
 Mocmont and similar soils: 5 percent of the unit  
 Rock outcrop: 3 percent of the unit  
 Blaincreek and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 3064D—Windham channery loam, 4 to 15 percent slopes

#### Map Unit Setting

*Landscape:* Uplands, foothills  
*Elevation:* 3,500 to 5,500 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 110 days

### Component Description

#### Windham and similar soils

*Extent:* 95 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 4 to 15 percent  
*Surface layer texture:* Channery loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Gravelly colluvium derived from limestone  
 Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.6 inches

### Additional Components

Beanlake and similar soils: 3 percent of the unit  
 Windham, cobbly, and similar soils: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 3137B—Musselshell-Crago complex, 2 to 8 percent slopes

#### Map Unit Setting

*Landscape:* Uplands, valleys  
*Elevation:* 3,600 to 4,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 105 to 120 days

### Component Description

#### Musselshell and similar soils

*Extent:* 70 percent of the map unit  
*Geomorphic position:* Alluvial fans, hillsides, plains  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Coarse-loamy alluvium derived from limestone  
 Coarse-loamy slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 7.5 inches

#### Crago and similar soils

*Extent:* 25 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains

*Slope:* 2 to 8 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly alluvium derived from limestone

Calcareous, gravelly colluvium derived from limestone

Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.8 inches

### Additional Components

Amesha and similar soils: 2 percent of the unit  
 Crago, cobbly, and similar soils: 2 percent of the unit  
 Delpoint and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

### 3141E—Crago-Pensore channery loams, 15 to 45 percent slopes

#### Map Unit Setting

*Landscape:* Foothills, uplands, valleys  
*Elevation:* 3,800 to 5,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 105 to 120 days

### Component Description

#### Crago and similar soils

*Extent:* 55 percent of the map unit  
*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Channery loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
 Calcareous, gravelly alluvium derived from limestone  
 Calcareous, gravelly colluvium derived from limestone  
 Calcareous, gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.8 inches

### **Pensore and similar soils**

*Extent:* 35 percent of the map unit

*Geomorphic position:* Escarpments, hillsides, knolls, ridges, strath terraces

*Slope:* 15 to 45 percent

*Surface layer texture:* Channery loam

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

*Drainage class:* Well drained

*Parent material:* Gravelly residuum derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 1.4 inches

### **Additional Components**

Musselshell and similar soils: 3 percent of the unit

Whitecow and similar soils: 3 percent of the unit

Delpoint and similar soils: 2 percent of the unit

Rock outcrop: 2 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **3218A—Meadowcreek-Fairway complex, 0 to 2 percent slopes**

### **Map Unit Setting**

*Landscape:* River valleys, valleys

*Elevation:* 3,600 to 4,500 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 105 to 120 days

### **Component Description**

#### **Meadowcreek and similar soils**

*Extent:* 70 percent of the map unit

*Geomorphic position:* Drainageways, flood plains, flood-plain steps, terraces

*Slope:* 0 to 2 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Somewhat poorly drained

*Parent material:* Fine-loamy alluvium over sandy and gravelly alluvium

*Native plant cover type:* Rangeland

*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 6.4 inches

### **Fairway and similar soils**

*Extent:* 25 percent of the map unit

*Geomorphic position:* Flood plains, flood-plain steps, terraces

*Slope:* 0 to 2 percent

*Surface layer texture:* Silt loam

*Restrictive feature:* None noted

*Drainage class:* Somewhat poorly drained

*Parent material:* Fine-loamy alluvium

*Native plant cover type:* Rangeland

*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 8.7 inches

### **Additional Components**

Havre and similar soils: 2 percent of the unit

Villy and similar soils: 2 percent of the unit

Rivra and similar soils: 1 percent of the unit

### **Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## **3233C—Geohrock-Crago very cobbly loams, 2 to 8 percent slopes**

### **Map Unit Setting**

*Landscape:* Valleys, uplands

*Elevation:* 3,600 to 4,300 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 105 to 120 days

### **Component Description**

#### **Geohrock and similar soils**

*Extent:* 60 percent of the map unit

*Geomorphic position:* Alluvial fans, terraces, valley floors

*Slope:* 2 to 8 percent

*Surface layer texture:* Very cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Gravelly Tertiary valley fill alluvium

Gravelly slope alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.5 inches

**Crago and similar soils**

*Extent:* 30 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains

*Slope:* 2 to 8 percent

*Surface layer texture:* Very cobbly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly alluvium derived from limestone

Calcareous, gravelly colluvium derived from limestone

Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.3 inches

**Additional Components**

Geohrock soils that have slopes of more than 8 percent: 5 percent of the unit

Nippt and similar soils: 5 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**3433E—Crago-Musselshell gravelly loams, 4 to 35 percent slopes****Map Unit Setting**

*Landscape:* Uplands, valleys

*Elevation:* 3,600 to 5,000 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 105 to 120 days

**Component Description****Crago and similar soils**

*Extent:* 50 percent of the map unit

*Geomorphic position:* Alluvial fans, escarpments, hillsides, plains

*Slope:* 4 to 35 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Calcareous, gravelly alluvium derived from limestone

Calcareous, gravelly colluvium derived from limestone

Calcareous, gravelly slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 3.8 inches

**Musselshell and similar soils**

*Extent:* 40 percent of the map unit

*Geomorphic position:* Alluvial fans, hillsides, plains

*Slope:* 4 to 35 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Coarse-loamy alluvium derived from limestone

Coarse-loamy slope alluvium derived from limestone

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 7.4 inches

**Additional Components**

Amesha and similar soils: 3 percent of the unit

Crago soils that have slopes of more than 35 percent: 3 percent of the unit

Crago, cobbly, and similar soils: 2 percent of the unit

Crago, stony, and similar soils: 1 percent of the unit

Pensore and similar soils: 1 percent of the unit

**Management**

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

**3486F—Peeler-Rock outcrop complex, 15 to 60 percent slopes****Map Unit Setting**

*Landscape:* Mountains

*Elevation:* 5,000 to 6,000 feet

*Mean annual precipitation:* 20 to 28 inches

*Frost-free period:* 50 to 70 days

**Component Description****Peeler and similar soils**

*Extent:* 80 percent of the map unit

*Geomorphic position:* Alluvial fans, mountain slopes, ridges

*Slope:* 15 to 60 percent

*Surface layer texture:* Bouldery sandy loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Fine-loamy slope alluvium derived from granite over sandy and gravelly residuum derived from granite

*Native plant cover type:* Forest land

*Flooding:* None

*Available water capacity:* Mainly 6.8 inches

### Rock outcrop

*Extent:* 10 percent of the map unit

*Definition:* This component consists mainly of exposed areas of hard, coarse grained granite bedrock. In places, a thin layer of decomposing granite (grus) covers the bedrock. Large, rounded boulders of granite are in the vicinity of the outcrops.

### Additional Components

Franconi and similar soils: 4 percent of the unit

Lowder and similar soils: 2 percent of the unit

Peeler, stony, and similar soils: 2 percent of the unit

Rubble land: 2 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 3501B—Fluvaquents-Fluvaquentic Haplustolls complex, 0 to 4 percent slopes

### Map Unit Setting

*Landscape:* River valleys, valleys

*Elevation:* 3,600 to 4,500 feet

*Mean annual precipitation:* 10 to 19 inches

*Frost-free period:* 90 to 120 days

### Component Description

#### Fluvaquents and similar soils

*Extent:* 60 percent of the map unit

*Geomorphic position:* Drainageways, flood plains, flood-plain steps

*Slope:* 0 to 4 percent

*Surface layer texture:* Silt loam

*Restrictive feature:* None noted

*Drainage class:* Poorly drained

*Native plant cover type:* Rangeland

*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 9.2 inches

#### Fluvaquentic Haplustolls and similar soils

*Extent:* 40 percent of the map unit

*Geomorphic position:* Drainageways, flood plains, flood-plain steps, terraces

*Slope:* 0 to 4 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Somewhat poorly drained

*Parent material:* Fine-loamy alluvium over sandy and gravelly alluvium

*Native plant cover type:* Rangeland

*Frequency of flooding:* Rare

*Water table:* Within a depth of 60 inches

*Available water capacity:* Mainly 6.7 inches

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 3513A—Attewan-Nippt complex, 0 to 2 percent slopes

### Map Unit Setting

*Landscape:* Valleys

*Elevation:* 3,600 to 4,500 feet

*Mean annual precipitation:* 10 to 14 inches

*Frost-free period:* 105 to 120 days

### Component Description

#### Attewan and similar soils

*Extent:* 60 percent of the map unit

*Geomorphic position:* Plains, stream terraces

*Slope:* 0 to 2 percent

*Surface layer texture:* Loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:*

Fine-loamy alluvium over sandy and gravelly alluvium

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 4.6 inches

#### Nippt and similar soils

*Extent:* 30 percent of the map unit

*Geomorphic position:* Flood-plain steps, terraces

*Slope:* 0 to 2 percent

*Surface layer texture:* Gravelly loam

*Restrictive feature:* None noted

*Drainage class:* Well drained

*Parent material:* Gravelly alluvium over calcareous

sandy and gravelly alluvium derived from fine grained igneous, sedimentary, and metamorphic rocks

*Native plant cover type:* Rangeland

*Flooding:* None

*Available water capacity:* Mainly 2.3 inches

### Additional Components

Nippt, very cobbly, and similar soils: 5 percent of the unit  
Nippt, very gravelly, and similar soils: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 3532B—Geohrock gravelly loam, 2 to 8 percent slopes

### Map Unit Setting

*Landscape:* Valleys, uplands  
*Elevation:* 3,600 to 4,500 feet  
*Mean annual precipitation:* 10 to 14 inches  
*Frost-free period:* 105 to 120 days

### Component Description

#### Geohrock and similar soils

*Extent:* 85 percent of the map unit  
*Geomorphic position:* Alluvial fans, terraces, valley floors  
*Slope:* 2 to 8 percent  
*Surface layer texture:* Gravelly loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly Tertiary valley fill alluvium  
Gravelly slope alluvium  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 3.7 inches

### Additional Components

Crago and similar soils: 5 percent of the unit  
Geohrock soils that have slopes of more than 8 percent: 5 percent of the unit  
Nippt and similar soils: 5 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 3664E—Windham-Whitecow-Lap channery loams, 15 to 45 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,000 to 5,000 feet

*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 110 days

### Component Description

#### Windham and similar soils

*Extent:* 45 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Channery loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly colluvium derived from limestone  
Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 4.6 inches

#### Whitecow and similar soils

*Extent:* 35 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Channery loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly colluvium derived from limestone  
Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 4.0 inches

#### Lap and similar soils

*Extent:* 15 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Channery loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
Gravelly colluvium over residuum derived from limestone  
Gravelly residuum derived from limestone  
*Native plant cover type:* Rangeland  
*Flooding:* None  
*Available water capacity:* Mainly 1.3 inches

### Additional Components

Lap, very shallow, and similar soils: 2 percent of the unit  
 Whitecow soils that have slopes of more than 45 percent: 2 percent of the unit  
 Maiden and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 3685F—Whitecow channery loam, 25 to 60 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands  
*Elevation:* 4,500 to 5,000 feet  
*Mean annual precipitation:* 12 to 19 inches  
*Frost-free period:* 90 to 115 days

### Component Description

#### Whitecow and similar soils

*Extent:* 95 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 25 to 60 percent  
*Surface layer texture:* Channery loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from limestone  
     Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 4.0 inches

### Additional Components

Rock outcrop: 2 percent of the unit  
 Whitecow soils that have slopes of more than 60 percent: 2 percent of the unit  
 Maiden and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## 3885F—Whitecow-Warneke channery loams, 15 to 45 percent slopes

### Map Unit Setting

*Landscape:* Foothills, uplands

*Elevation:* 4,000 to 5,500 feet  
*Mean annual precipitation:* 15 to 19 inches  
*Frost-free period:* 90 to 110 days

### Component Description

#### Whitecow and similar soils

*Extent:* 70 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Channery loam  
*Restrictive feature:* None noted  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly colluvium derived from limestone  
     Gravelly slope alluvium derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 4.0 inches

#### Warneke and similar soils

*Extent:* 20 percent of the map unit  
*Geomorphic position:* Divides, escarpments, hillsides, ridges  
*Slope:* 15 to 45 percent  
*Surface layer texture:* Channery loam  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Parent material:*  
     Gravelly residuum derived from limestone  
     Gravelly slope alluvium derived from limestone over residuum derived from limestone  
*Native plant cover type:* Forest land  
*Flooding:* None  
*Available water capacity:* Mainly 1.1 inches

### Additional Components

Maiden, very gravelly, and similar soils: 6 percent of the unit  
 Whitecow soils that have slopes of more than 45 percent: 3 percent of the unit  
 Maiden and similar soils: 1 percent of the unit

### Management

- For information about managing this map unit, see the appropriate sections in Part II of this publication.

## DAM—Dam

### Description

*Extent:* 100 percent of the map unit  
*Definition:* A barrier constructed across a waterway for

the purpose of controlling the flow or raising the level of the water

**M-W—Miscellaneous water**

**Description**

*Extent:* 100 percent of the map unit

*Definition:* Areas of sewage lagoons, industrial water pits, fish hatcheries, etc.

**W—Water**

**Description**

*Extent:* 100 percent of the map unit

*Definition:* Streams, lakes, ponds, and reservoirs that in most years contain water at least during the period when the weather is warm enough for the growth of plants. Many areas contain water throughout the year.



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# Glossary

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**Ablation till.** Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

**Aeration, soil.** The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

**Aggregate, soil.** Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

**Alkali (sodic) soil.** See Sodic (alkali) soil.

**Alluvial fan.** A body of alluvium, with overflow of water and debris flow deposits, whose surface forms a segment of a cone that radiates downslope from the point where the stream emerges from a narrow valley onto a less sloping surface. Source uplands range in relief and area extent from mountains to gullied terrains on hillslopes.

**Alluvium.** Material, such as sand, silt, or clay, deposited on land by streams.

**Alpha,alpha-dipyridyl.** A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

**Animal unit month (AUM).** The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

**Aquic conditions.** Current soil wetness characterized by saturation, reduction, and redoximorphic features.

**Argillite.** Weakly metamorphosed mudstone or shale.

**Aspect.** The direction in which a slope faces.

**Association, soil.** A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

**Available water capacity (available moisture capacity).** The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the

amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low .....	0 to 3.75
Low .....	3.75 to 5.0
Moderate .....	5.0 to 7.5
High .....	more than 7.5

**Avalanche chute.** The track or path formed by an avalanche.

**Backslope.** The geomorphic component that forms the steepest inclined surface and principal element of many hillslopes. Backslopes in profile are commonly steep and linear and descend to a footslope. In terms of gradational process, backslopes are erosional forms produced mainly by mass wasting and running water.

**Badland.** Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

**Basal area.** The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

**Basal till.** Compact glacial till deposited beneath the ice.

**Base saturation.** The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

**Base slope.** A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

**Bedding planes.** Fine strata, less than 5 millimeters

thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

**Bedrock.** The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

**Bedrock-floored plain.** An extensive nearly level to gently rolling or moderately sloping area that is underlain by hard bedrock and has a slope of 0 to 8 percent.

**Bench terrace.** A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

**Blowout.** A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

**Board foot.** A unit of measure of the wood in lumber, logs, or trees. The amount of wood in a board 1 foot wide, 1 foot long, and 1 inch thick before finishing.

**Bottom land.** The normal flood plain of a stream, subject to flooding.

**Boulders.** Rock fragments larger than 2 feet (60 centimeters) in diameter.

**Bouldery.** Refers to a soil in an area where 0.01 to 0.1 percent of the surface is covered with boulders.

**Bouldery soil material.** Soil that is 15 to 35 percent, by volume, rock fragments that are dominantly larger than 24 inches (60 centimeters) in diameter.

**Breaks.** The steep and very steep broken land at the border of an upland summit that is dissected by ravines.

**Breast height.** An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

**Brush management.** Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

**Cable yarding.** A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees

generally are reeled in while one end is lifted or the entire log is suspended.

**Calcareous soil.** A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

**Caliche.** A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds directly beneath the solum, or it is exposed at the surface by erosion.

**California bearing ratio (CBR).** The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

**Canopy.** The leafy crown of trees or shrubs. (See Crown.)

**Capillary water.** Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

**Cation.** An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

**Cation-exchange capacity.** The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

**Channeled.** Refers to a drainage area in which natural meandering or repeated branching and convergence of a streambed have created deeply incised cuts, either active or abandoned, in alluvial material.

**Channery soil material.** Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

**Chemical treatment.** Control of unwanted vegetation through the use of chemicals.

**Chiseling.** Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

**Cirque.** A semicircular, concave, bowl-like area that has steep faces primarily resulting from glacial ice and snow abrasion.

- Clay.** As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.
- Clay film.** A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.
- Claypan.** A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.
- Clearcut.** A method of forest harvesting that removes the entire stand of trees in one cutting. Reproduction is achieved artificially or by natural seeding from the adjacent stands.
- Climax plant community.** The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.
- Closed depression.** A low area completely surrounded by higher ground and having no natural outlet.
- Coarse textured soil.** Sand or loamy sand.
- Cobble (or cobblestone).** A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.
- Cobbly soil material.** Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.
- Codominant trees.** Trees whose crowns form the general level of the forest canopy and that receive full light from above but comparatively little from the sides.
- COLE (coefficient of linear extensibility).** See Linear extensibility.
- Colluvium.** Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.
- Commercial forest.** Forestland capable of producing 20 cubic feet or more per acre per year at the culmination of the mean annual increment.
- Complex, soil.** A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.
- Complex slope.** Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.
- Concretions.** Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.
- Conglomerate.** A coarse grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.
- Conservation cropping system.** Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.
- Conservation tillage.** A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.
- Consistence, soil.** Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."
- Consolidated sandstone.** Sandstone that disperses within a few hours when fragments are placed in water. The fragments are extremely hard or very hard when dry, are not easily crushed, and cannot be textured by the usual field method.
- Consolidated shale.** Shale that disperses within a few hours when fragments are placed in water. The fragments are extremely hard or very hard when dry and are not easily crushed.
- Contour stripcropping.** Growing crops in strips that

follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

**Control section.** The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

**Coprogenous earth (sedimentary peat).** Fecal material deposited in water by aquatic organisms.

**Corrosion.** Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

**Cover crop.** A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

**Crop residue management.** Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

**Cropping system.** Growing crops according to a planned system of rotation and management practices.

**Cross-slope farming.** Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

**Crown.** The upper part of a tree or shrub, including the living branches and their foliage.

**Culmination of the mean annual increment (CMAI).**

The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

**Decreasers.** The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

**Deferred grazing.** Postponing grazing or resting grazing land for a prescribed period.

**Depth, soil.** Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

**Dip slope.** A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

**Diversion (or diversion terrace).** A ridge of earth,

generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

**Divided-slope farming.** A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

**Dominant trees.** Trees whose crowns form the general level of the forest canopy and that receive full light from above and from the sides.

**Drainage, surface.** Runoff, or surface flow of water, from an area.

**Drainage class (natural).** Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained*. These classes are defined in the “Soil Survey Manual.”

**Drainageway.** An area of ground at a lower elevation than the surrounding ground and in which water collects and is drained to a closed depression or lake or to a drainageway at a lower elevation. A drainageway may or may not have distinctly incised channels at its upper reaches or throughout its course.

**Drumlin.** A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

**Duff.** A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

**Dune.** A mound, ridge, or hill of loose, windblown granular material (generally sand), either bare or covered with vegetation.

**Ecological site.** An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the

product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

**Eluviation.** The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

**Endosaturation.** A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

**Eolian soil material.** Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

**Ephemeral stream.** A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

**Episaturation.** A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

**Erosion.** The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

*Erosion* (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

*Erosion* (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

**Erosion pavement.** A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

**Escarpment.** A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

**Esker.** A long, narrow, sinuous, steep-sided ridge composed of irregularly stratified sand and gravel that were deposited by a subsurface stream flowing between ice walls or through ice tunnels of a retreating glacier and that were left behind when the ice melted. Eskers range from less than a mile to more than 100 miles in length and from 10 to 100 feet in height.

**Even aged.** Refers to a stand of trees in which only small differences in age occur between individual trees. A range of 20 years is allowed.

**Extrusive rock.** Igneous rock derived from deep-seated molten matter (magma) emplaced on the earth's surface.

**Fallow.** Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

**Fertility, soil.** The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

**Fibric soil material (peat).** The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

**Field moisture capacity.** The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity*, *normal moisture capacity*, or *capillary capacity*.

**Fine textured soil.** Sandy clay, silty clay, or clay.

**Firebreak.** An area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

**First bottom.** The normal flood plain of a stream, subject to frequent or occasional flooding.

**Flaggy soil material.** Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

**Flagstone.** A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

**Flood plain.** A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

**Fluvial.** Of or pertaining to rivers; produced by river action, as a fluvial plain.

**Foothill.** A steeply sloping upland that has relief of as

much as 1,000 feet (300 meters) and fringes a mountain range or high-plateau escarpment.

**Footslope.** The geomorphic component that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. In terms of gradational processes, a footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

**Forb.** Any herbaceous plant not a grass or a sedge.

**Forest cover.** All trees and other woody plants (underbrush) covering the ground in a forest.

**Forest type.** A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

**Fragipan.** A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

**Genesis, soil.** The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

**Giant ripple mark.** The undulating surface sculpture produced in noncoherent granular materials by currents of water and by the agitation of water in wave action during the drainage of large glacial lakes, such as Glacial Lake Missoula.

**Glacial drift.** Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

**Glacial outwash.** Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

**Glacial till.** Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

**Glaciated uplands.** Land areas that were previously covered by continental or alpine glaciers and that are at a higher elevation than the flood plain.

**Glaciofluvial deposits.** Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

**Glaciolacustrine deposits.** Material ranging from fine clay to sand derived from glaciers and deposited

in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

**Gleyed soil.** Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

**Grassed waterway.** A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

**Gravel.** Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

**Gravelly soil material.** Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter. Very gravelly soil is 35 to 60 percent gravel, and extremely gravelly soil is more than 60 percent gravel.

**Grazeable forestland.** Land capable of sustaining livestock grazing by producing forage of sufficient quantity during one or more stages of secondary forest succession.

**Green manure crop** (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

**Ground water.** Water filling all the unblocked pores of the material below the water table.

**Grus.** The fragmental products of in-situ granular disintegration of granite and granitic rocks.

**Gully.** A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

**Gypsum.** A mineral consisting of hydrous calcium sulfate.

**Habitat type.** An aggregation of all land areas capable of producing similar climax plant communities.

**Hard bedrock.** Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

**Hardpan.** A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

**Head out.** To form a flower head.

**Head slope.** A geomorphic component of hills

consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

**Heavy metal.** Inorganic substances that are solid at ordinary temperatures and are not soluble in water. They form oxides and hydroxides that are basic. Examples are copper, iron, cadmium, zinc, manganese, lead, and arsenic.

**Hemic soil material (mucky peat).** Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

**High-residue crops.** Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

**Hill.** A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

**Horizon, soil.** A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

*O horizon.*—An organic layer of fresh and decaying plant residue.

*A horizon.*—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

*E horizon.*—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

*B horizon.*—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

*C horizon.*—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

*Cr horizon.*—Soft, consolidated bedrock beneath the soil.

*R layer.*—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

**Humus.** The well decomposed, more or less stable part of the organic matter in mineral soils.

**Hydrologic soil groups.** Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

**Igneous rock.** Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

**Illuviation.** The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

**Impervious soil.** A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

**Increasers.** Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

**Infiltration.** The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

**Infiltration capacity.** The maximum rate at which water can infiltrate into a soil under a given set of conditions.

**Infiltration rate.** The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be

limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

**Intake rate.** The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2 .....	very low
0.2 to 0.4 .....	low
0.4 to 0.75 .....	moderately low
0.75 to 1.25 .....	moderate
1.25 to 1.75 .....	moderately high
1.75 to 2.5 .....	high
More than 2.5 .....	very high

**Interfluve.** An elevated area between two drainageways that sheds water to those drainageways.

**Intermittent stream.** A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

**Invaders.** On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

**Iron depletions.** Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

**Irrigation.** Application of water to soils to assist in production of crops. Methods of irrigation are:

*Basin.*—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

*Border.*—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

*Controlled flooding.*—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

*Corrugation.*—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

*Drip (or trickle).*—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

*Furrow.*—Water is applied in small ditches made

by cultivation implements. Furrows are used for tree and row crops.

*Sprinkler.*—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

*Subirrigation.*—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

*Wild flooding.*—Water, released at high points, is allowed to flow onto an area without controlled distribution.

**Kame.** An irregular, short ridge or hill of stratified glacial drift.

**Kame terrace.** A terracelike ridge consisting of stratified sand and gravel that were deposited by a meltwater stream flowing between a melting glacier and a higher valley wall or lateral moraine and that remained after the disappearance of the ice. It is commonly pitted with kettles and has an irregular ice-contact slope.

**$K_{sat}$ .** Saturated hydraulic conductivity. (See Permeability.)

**Lacustrine deposit.** Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

**Lake plain.** A surface marking the floor of an extinct lake, filled in by well sorted, stratified sediments.

**Landslide.** The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

**Large stones** (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

**Lateral moraine.** A ridgelike moraine carried on and deposited at the side margin of a valley glacier. It is composed chiefly of rock fragments derived from the valley walls by glacial abrasion and plucking or by mass wasting.

**Leaching.** The removal of soluble material from soil or other material by percolating water.

**Linear extensibility.** Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at  $1/3$ - or  $1/10$ -bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

- Liquid limit.** The moisture content at which the soil passes from a plastic to a liquid state.
- Loam.** Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.
- Loamy soil.** Coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, or silty clay loam.
- Loess.** Fine grained material, dominantly of silt-sized particles, deposited by wind.
- Low-residue crops.** Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.
- Low strength.** The soil is not strong enough to support loads.
- Marl.** An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal amounts.
- Masses.** Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.
- Mean annual increment (MAI).** The average annual increase in volume of a tree during its entire life.
- Mechanical treatment.** Use of mechanical equipment for seeding, brush management, and other management practices.
- Medium textured soil.** Very fine sandy loam, loam, silt loam, or silt.
- Merchantable trees.** Trees that are of sufficient size to be economically processed into wood products.
- Metamorphic rock.** Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.
- Microhigh.** An area that is 2 to 12 inches higher than the adjacent microlow.
- Microlow.** An area that is 2 to 12 inches lower than the adjacent microhigh.
- Mineral soil.** Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.
- Minimum tillage.** Only the tillage essential to crop production and prevention of soil damage.
- Miscellaneous area.** An area that has little or no natural soil and supports little or no vegetation.
- Moderately coarse textured soil.** Coarse sandy loam, sandy loam, or fine sandy loam.
- Moderately fine textured soil.** Clay loam, sandy clay loam, or silty clay loam.
- Mollic epipedon.** A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.
- Moraine.** An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.
- Morphology, soil.** The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.
- Mountain.** A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.
- Muck.** Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)
- Mudstone.** Sedimentary rock formed by induration of silt and clay in approximately equal amounts.
- Munsell notation.** A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.
- Natric horizon.** A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.
- Naturalized pasture.** Forestland that is used primarily for the production of forage for grazing by livestock rather than for wood products. Overstory trees are removed or managed in a way that promotes the native and introduced understory vegetation on the site. This vegetation is managed for its forage value through the application of grazing management principles.
- Neutral soil.** A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)
- Nose slope.** A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.
- Nutrient, plant.** Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium,

magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

**Organic matter.** Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low .....	less than 0.5 percent
Low .....	0.5 to 1.0 percent
Moderately low .....	1.0 to 2.0 percent
Moderate .....	2.0 to 4.0 percent
High .....	4.0 to 8.0 percent
Very high .....	more than 8.0 percent

**Outwash plain.** A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

**Overstory.** The trees in a forest that form the upper crown cover.

**Oxbow.** The horseshoe-shaped channel of a former meander, remaining after the stream formed a cutoff across a narrow meander neck.

**Pan.** A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan*, *fragipan*, *claypan*, *plowpan*, and *traffic pan*.

**Parent material.** The unconsolidated organic and mineral material in which soil forms.

**Peat.** Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

**Ped.** An individual natural soil aggregate, such as a granule, a prism, or a block.

**Pedon.** The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

**Percolation.** The movement of water through the soil.

**Permeability.** The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms

describing permeability, measured in inches per hour, are as follows:

Impermeable .....	less than 0.0015 inch
Very slow .....	0.0015 to 0.06 inch
Slow .....	0.06 to 0.2 inch
Moderately slow .....	0.2 to 0.6 inch
Moderate .....	0.6 inch to 2.0 inches
Moderately rapid .....	2.0 to 6.0 inches
Rapid .....	6.0 to 20 inches
Very rapid .....	more than 20 inches

**pH value.** A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

**Phase, soil.** A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

**Plastic limit.** The moisture content at which a soil changes from semisolid to plastic.

**Plasticity index.** The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

**Playa.** The generally dry and nearly level lake plain that occupies the lowest parts of closed depressional areas, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff.

**Plowpan.** A compacted layer formed in the soil directly below the plowed layer.

**Ponding.** Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

**Poorly graded.** Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

**Potential natural community (PNC).** The biotic community that would become established on an ecological site if all successional sequences were completed without interference by human activities under the present environmental conditions. Natural disturbances are inherent in its development. The PNC may include acclimatized or naturalized nonnative species.

**Potential rooting depth (effective rooting depth).**

Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

**Prescribed burning.** Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

**Productivity, soil.** The capability of a soil for producing a specified plant or sequence of plants under specific management.

**Profile, soil.** A vertical section of the soil extending through all its horizons and into the parent material.

**Proper grazing use.** Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

**Quartzite, metamorphic.** Rock consisting mainly of quartz that formed through recrystallization of quartz-rich sandstone or chert.

**Quartzite, sedimentary.** Very hard but unmetamorphosed sandstone consisting chiefly of quartz grains.

**Range condition.** The present composition of the plant community on a range site in relation to the potential natural plant community for that site. (See Similarity index.)

**Range site.** See Ecological site.

**Rangeland.** Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

**Reaction, soil.** A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid .....	less than 3.5
Extremely acid .....	3.5 to 4.4
Very strongly acid .....	4.5 to 5.0
Strongly acid .....	5.1 to 5.5
Moderately acid .....	5.6 to 6.0
Slightly acid .....	6.1 to 6.5
Neutral .....	6.6 to 7.3
Slightly alkaline .....	7.4 to 7.8
Moderately alkaline .....	7.9 to 8.4
Strongly alkaline .....	8.5 to 9.0
Very strongly alkaline .....	9.1 and higher

**Recessional moraine.** A moraine formed during a

temporary but significant halt in the retreat of a glacier.

**Red beds.** Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

**Redox concentrations.** See Redoximorphic concentrations.

**Redox depletions.** See Redoximorphic depletions.

**Redox features.** See Redoximorphic features.

**Redoximorphic concentrations.** Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

**Redoximorphic depletions.** Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

**Redoximorphic features.** Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

**Reduced matrix.** A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

**Regeneration.** The new growth of a natural plant community, developing from seed.

**Regolith.** The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

**Relict stream terrace.** One of a series of platforms in or adjacent to a stream valley that formed prior to the current stream system.

**Relief.** The elevations or inequalities of a land surface, considered collectively.

**Residuum (residual soil material).** Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

**Rill.** A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

**Riser.** The relatively short, steeply sloping area below a terrace tread that grades to a lower terrace tread or base level.

**Road cut.** A sloping surface produced by mechanical

means during road construction. It is commonly on the uphill side of the road.

**Rock fragments.** Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

**Root zone.** The part of the soil that can be penetrated by plant roots.

**Runoff.** The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

**Saline soil.** A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

**Salinity.** The electrical conductivity of a saline soil. It is expressed, in millimhos per centimeter, as follows:

Nonsaline .....	0 to 4
Slightly saline .....	4 to 8
Moderately saline .....	8 to 16
Strongly saline .....	more than 16

**Sand.** As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

**Sandstone.** Sedimentary rock containing dominantly sand-sized particles.

**Sandy soil.** Sand or loamy sand.

**Sapric soil material (muck).** The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

**Saturation.** Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

**Sawlogs.** Logs of suitable size and quality for the production of lumber.

**Scarification.** The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

**Scribner's log rule.** A method of estimating the number of board feet that can be cut from a log of a given diameter and length.

**Sedimentary plain.** An extensive nearly level to gently rolling or moderately sloping area that is underlain by sedimentary bedrock and that has a slope of 0 to 8 percent.

**Sedimentary rock.** Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

**Sedimentary uplands.** Land areas of bedrock formed from water- or wind-deposited sediments. They are higher on the landscape than the flood plain.

**Semiconsolidated sedimentary beds.** Soft geologic sediments that disperse when fragments are placed in water. The fragments are hard or very hard when dry. Determining the texture by the usual field method is difficult.

**Sequum.** A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

**Series, soil.** A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

**Shale.** Sedimentary rock formed by the hardening of a clay deposit.

**Sheet erosion.** The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

**Shoulder.** The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.

**Shrink-swell (in tables).** The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

**Side slope.** A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.

**Silica.** A combination of silicon and oxygen. The mineral form is called quartz.

**Silt.** As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

**Siltstone.** Sedimentary rock made up of dominantly silt-sized particles.

**Similar soils.** Soils that share limits of diagnostic criteria, behave and perform in a similar manner,

and have similar conservation needs or management requirements for the major land uses in the survey area.

**Similarity index.** The percentage of a specific vegetation-state plant community that is presently on the site.

**Sinkhole.** A depression in the landscape where limestone has been dissolved.

**Site index.** A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

**Skid trails.** Pathways along which logs are dragged to a common site for loading onto a logging truck.

**Slash.** The branches, bark, treetops, reject logs, and broken or uprooted trees left on the ground after logging.

**Slickens.** Accumulations of fine textured material, such as that separated in placer-mine and ore-mill operations. Slickens from ore mills consist largely of freshly ground rock that commonly has undergone chemical treatment during the milling process. Slickens are commonly confined in a specially constructed basin.

**Slickensides.** Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

**Slope.** The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. In this survey the following slope classes are recognized:

Nearly level .....	0 to 2 percent
Gently sloping .....	2 to 4 percent
Moderately sloping .....	4 to 8 percent
Strongly sloping .....	8 to 15 percent
Moderately steep .....	15 to 25 percent
Steep .....	25 to 45 percent
Very steep .....	more than 45 percent

**Slope** (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specified use.

**Sodic (alkali) soil.** A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent

or more of the total exchangeable bases), or both, that plant growth is restricted.

**Sodicity.** The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of  $Na^+$  to  $Ca^{++} + Mg^{++}$ . The degrees of sodicity and their respective ratios are:

Slight .....	less than 13:1
Moderate .....	13-30:1
Strong .....	more than 30:1

**Sodium adsorption ratio (SAR).** A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

**Soft bedrock.** Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

**Soil.** A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief and by the passage of time.

**Soil separates.** Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand .....	2.0 to 1.0
Coarse sand .....	1.0 to 0.5
Medium sand .....	0.5 to 0.25
Fine sand .....	0.25 to 0.10
Very fine sand .....	0.10 to 0.05
Silt .....	0.05 to 0.002
Clay .....	less than 0.002

**Solum.** The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

**Stones.** Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

**Stony.** Refers to a soil containing stones in numbers that interfere with or prevent tillage. In an area of stony soil, stones cover 0.01 to 0.1 percent of the surface. Very stony means that stones cover 0.1 to

3.0 percent of the surface, and extremely stony means that stones cover 3 to 15 percent of the surface.

**Strath terrace.** A type of stream terrace, formed as an erosional surface cut on bedrock and thinly mantled with stream deposits (alluvium).

**Stream channel.** The hollow bed where a natural stream of surface water flows or may flow; the deepest or central part of the bed, formed by the main current and covered more or less continuously by water.

**Strippcropping.** Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

**Structure, soil.** The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

**Stubble mulch.** Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

**Subsoil.** Technically, the B horizon; roughly, the part of the solum below plow depth.

**Subsoiling.** Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

**Substratum.** The part of the soil below the solum.

**Subsurface layer.** Any surface soil horizon (A, E, AB, or EB) below the surface layer.

**Summer fallow.** The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

**Summit.** The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

**Surface layer.** The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

**Tailwater.** The water directly downstream from a structure.

**Talus.** Fragments of rock and other soil material accumulated by gravity at the foot of cliffs or steep slopes.

**Taxadjuncts.** Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

**Terminal moraine.** A belt of thick glacial drift that generally marks the termination of important glacial advances.

**Terrace.** An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

**Terrace (geologic).** An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

**Terracette.** A small, irregular, steplike form on steep hillslopes, especially in pasture, formed by creep or erosion of surficial materials that may or may not be induced by trampling of livestock.

**Texture, soil.** The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*, *silt loam*, *silt*, *sandy clay loam*, *clay loam*, *silty clay loam*, *sandy clay*, *silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”

**Till plain.** An extensive nearly level to gently rolling or moderately sloping area that is underlain by or consists of till and that has a slope of 0 to 8 percent.

**Tilth, soil.** The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

**Toeslope.** The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a

hillslope continuum that grades to valley or closed-depression floors.

**Topsoil.** The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

**Trace elements.** Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

**Trafficability.** The degree to which a soil is capable of supporting vehicular traffic across a wide range in soil moisture conditions.

**Tread.** The relatively flat terrace surface that was cut or built by stream or wave action.

**Tuff.** A compacted deposit that is 50 percent or more volcanic ash and dust.

**Understory.** Any plants in a forest community that grow to a height of less than 5 feet.

**Upland.** Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

**Valley.** An elongated depressional area primarily developed by stream action.

**Valley fill.** In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

**Variation.** Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

**Varve.** A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

**Water bars.** Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

**Weathering.** All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

**Well graded.** Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

**Wilting point (or permanent wilting point).** The moisture content of soil, on an oven-dry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

**Windthrow.** The uprooting and tipping over of trees by the wind.

# NRCS Accessibility Statement

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