



United States
Department of
Agriculture

In cooperation with
Montana Agricultural
Experiment Station

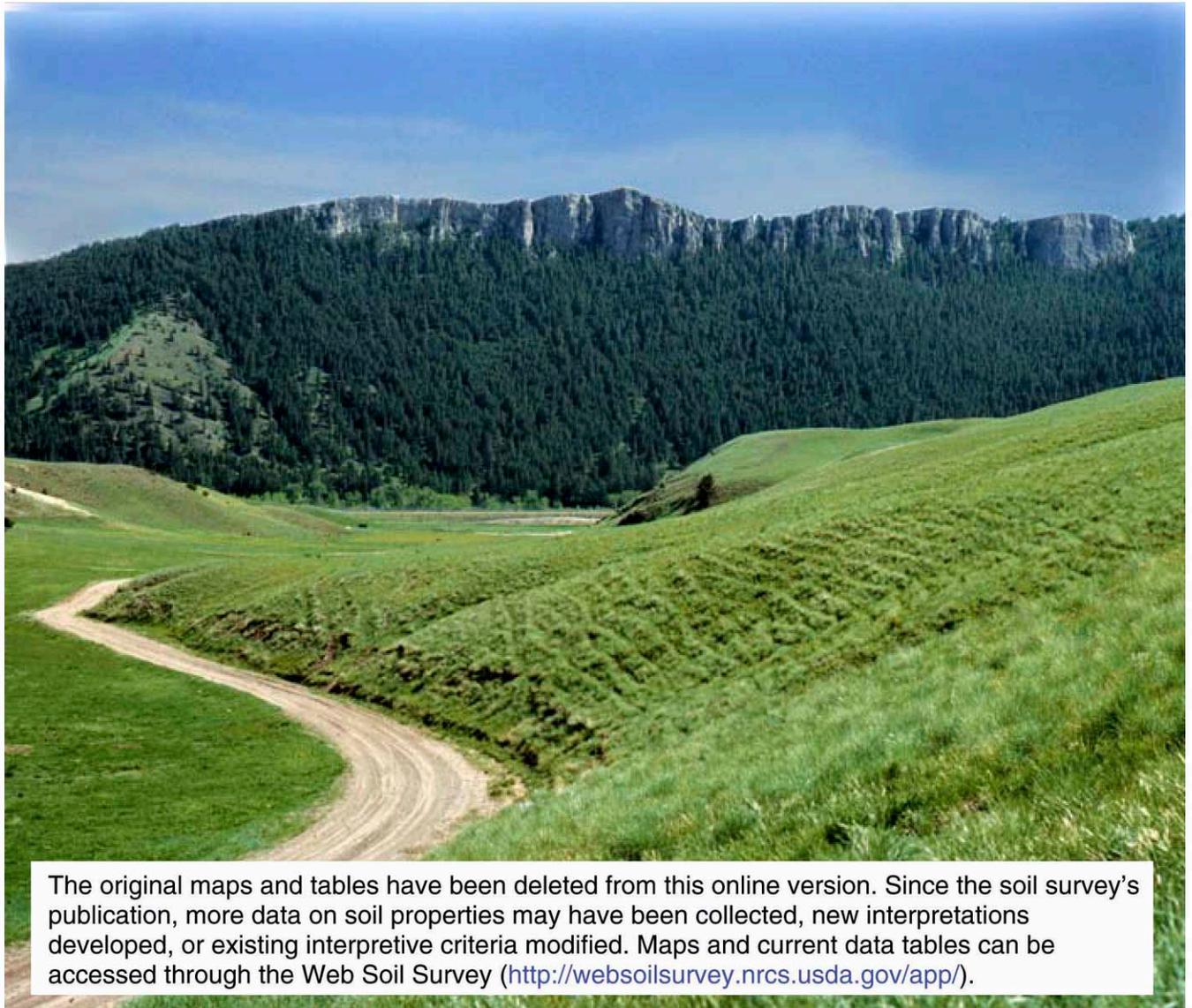
MT621—Soil Survey of Granite County Area, Montana



Natural
Resources
Conservation
Service



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

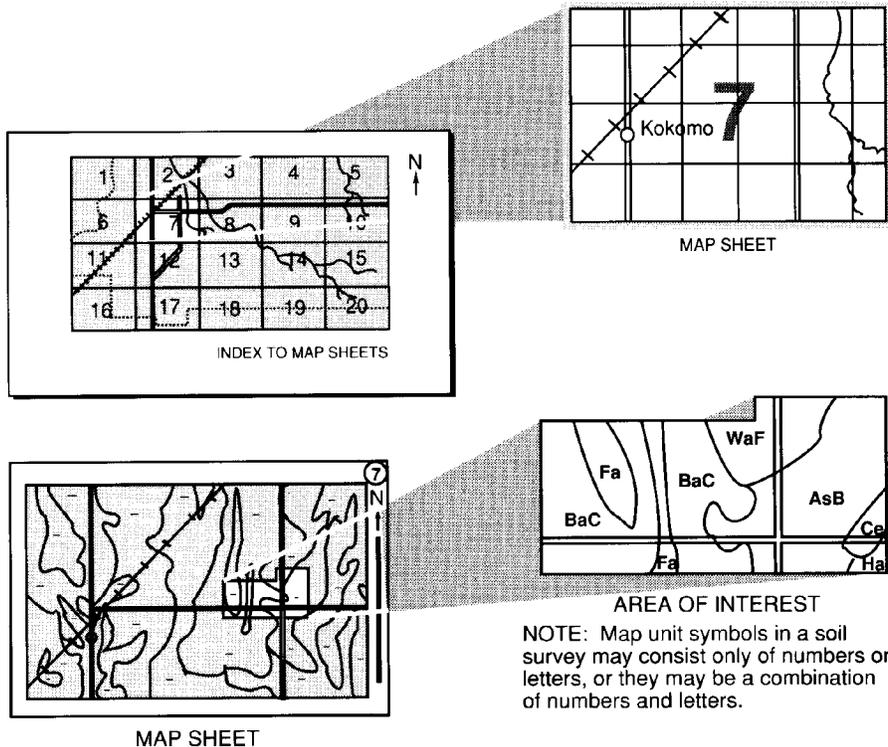
Detailed Soil Maps

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.



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 1994. Soil names and descriptions were approved in 1996. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1996. This survey was made cooperatively by the Natural Resources Conservation Service and the Montana Agricultural Experiment Station. It is part of the technical assistance furnished to the Granite County 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: Looking south from Rattler Gulch, the foreground is an area of Winspect gravelly loam, 8 to 15 percent slopes, while the background is an area of Whitecow gravelly loam, cool, 35 to 60 percent slopes.

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

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Foreword

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

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

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

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

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

Dave White
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Soil Survey of Granite County Area, Montana

Fieldwork by Brian D. Dougherty, Arnie Irwin, and Huey A. Long,
Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
the Montana Agricultural Experiment Station

GRANITE COUNTY AREA is located in southwestern Montana (fig. 1). Granite County is bounded on the north by Missoula County, on the east by Powell County, on the west by Ravalli County, and on the south by Deer Lodge County. Philipsburg, located in the south-central part, is the county seat. The survey area mainly consists of nonfederal land in the intermontane valleys and includes 414,400 acres, covering approximately 655 of the 1,733 square miles in Granite County.

The survey area's residents are dependent on natural resources for most of their livelihood. Ranching and farming, timber harvesting, mining, and related industries rely on the wealth of the geology, soil, and water of the region.

Elevation ranges from 3,600 to 7,000 feet. Mean annual precipitation ranges from 10 to 40 inches, and mean annual temperature ranges from 35 to 43 degrees F. The growing season ranges from 30 to 105 days.

General Nature of the Survey Area

This section describes some of the environmental and cultural features that affect the use and management of soils in the survey area. These features are history and development; physiography and drainage; mineral and ground-water resources; industry, transportation, and recreation; geology; and climate.

History and Development

The discovery of gold in the late 1850s brought a rapid influx of prospectors, miners, and fortune seekers to the Granite County Area. Many small

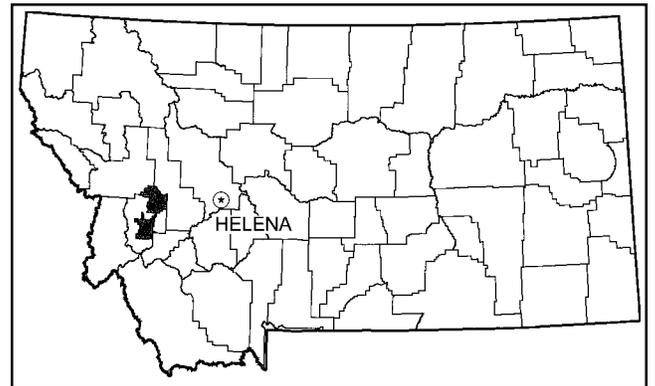


Figure 1.—Location of Granite County Area, Montana

communities, such as Beartown, Garnet, Granite City, Sunrise, and others, sprang up almost overnight. During the boom period, the population of several of these settlements numbered between 5,000 and 6,000. Today, Drummond, Hall, and Philipsburg are the only urban centers in the survey area. The other communities have largely either disappeared or remained as uninhabited ghost towns.

Ranching development accompanied the growth of mining activities. At first, industry was limited to production that could be consumed locally. The Mullan Road, a military road connecting the Missouri River transportation facilities at Fort Benton, Montana, to the military outpost at Walla Walla, Washington, provided the only access to the mining towns until the establishment of the Northern Pacific Railway in 1883.

The mining boom lasted up to and including World War I, but the depression that followed closed many marginal operations. Some people left the area while

others remained and began ranching, developing their holdings, and establishing permanent homes. Today, ranching, as well as some mining and forest industries, supports the economy of the survey area. Hard-rock mining and sawmills furnish a number of full- and part-time employment. Manganese, silver, lead, and zinc are mined and milled near Philipsburg. Three stud mills, one at Hall and two at Drummond, harvest and process lodgepole pine, Douglas-fir, and ponderosa pine for the commercial market. Three post-and-pole operations, one at Philipsburg and two at Drummond, process lodgepole pine for posts, poles, and grape-stakes.

Industry, Transportation, and Recreation

Raising livestock, growing forage crops and hardy varieties of small grains, and producing timber are the principal industries in the Granite County Area. Mining of precious metals is also of importance. Raising livestock, primarily cow-calf operations, both registered and commercial, accounts for most farm income. Barley, oats, and some spring wheat are generally grown in rotation with forage crops. Small grains are mainly used for feed grain. Alfalfa and alfalfa grass-hay are grown on irrigated land. Wild hay, both flood irrigated and subirrigated, is grown on the bottomland along the major drainages.

Public stockyards at Butte and Missoula provide ranchers with good livestock marketing facilities. Some cattle are sold directly from the ranch to feeder buyers, and some operations send feeder calves to sale barns servicing the farmer feeder operations in eastern Nebraska.

State Highway 1 runs north and south from Drummond to Georgetown through the central part of the Granite County Area. Interstate Highway 90 enters the county 5 miles east of Drummond and runs west along the Clark Fork River, exiting the county 5 miles west of Bearmouth. State Highway 38 runs west from its junction with State Highway 1 at Porters Corner to Skalkaho Pass in the southern portion of the county. State Highway 348 runs west near Philipsburg, crosses the John Long Range into the Rock Creek drainage, and then runs north to its junction with Interstate 90 near Clinton in Missoula County.

Daily bus service is available to most communities. Montana Rail Link is the principal railroad providing traffic east and west through the north-central portion of the county, paralleling the Clark Fork River and Interstate 90. Granite County airport, located southeast of Drummond, provides air traffic as a small community airport.

Granite County Area provides numerous opportunities for outdoor recreation. Bighorn sheep, black bear, elk, mule deer, and white-tailed deer are abundant and offer excellent big game hunting. Camping, fishing, and water recreation activities can be found along the Clark Fork River, Flint Creek, and Rock Creek drainages. Numerous small lakes, ponds, dams, and small streams throughout the area also provide good fishing.

Georgetown Lake, located in the southwestern corner of Granite County, provides excellent year-round recreational opportunities. Camping, fishing, hiking, skiing, and snowmobile opportunities are available.

The adjacent Anaconda-Pintler Wilderness, in the southern part of the county, provides excellent backpacking, boating, camping, fishing, horse pack trips, and hunting opportunities.

Physiography and Drainage

The Granite County Area lies in the Northern Rocky Mountain physiographic province, within the structural province of the Rocky Mountain Fold-Thrust Belt. The Continental Divide forms the southeastern county border for approximately 15 miles.

The Granite County Area contains portions of five mountain ranges: the Garnet Range trends northwest-southeast across the northern portion, the Sapphire Mountains trend approximately north-south on the west side, the John Long Mountains run approximately north by northwest through the central portion, the Flint Creek Range trends southwest-northeast in the southeastern portion, and the Anaconda Range forms the Continental Divide at the southern boundary.

The survey area is characterized by rugged, mountainous terrain, drained by Flint Creek and the Clark Fork River. Here, the valleys are flat and wide. The Anaconda and Flint Creek Ranges have high relief, with glacially sculpted valleys and extensive pediments. The John Long, Garnet, and Sapphire Ranges have relatively low relief.

The soil survey area extends from the Clark Fork Valley up the Flint Creek Valley, including the southern extension of the John Long Mountains and the southern portions of the Garnet Range located within Granite County. The areas not included in this soil survey consist mostly of the rugged mountainous areas in the western, southern, and southeastern portions of the county, including the Anaconda and Flint Creek Ranges, the Sapphire Mountains, and the northern half of the John Long Mountains. The unmapped areas include all Forest Service-owned

land and portions of the Welcome Creek and Anaconda-Pintler Wilderness Areas. The Beaverhead-Deer Lodge National Forest—North Section (MT635) soil survey has soils information for most of these mountainous areas in Granite County.

In the soil survey area, elevations range from 3,680 feet (1,120 m) above sea level west of Nimrod, where the Clark Fork River flows out of the soil survey area, to a high of approximately 7,000 feet (2,135 m) at both Lone Pine Ridge in the southwestern corner and Silver Hill in the southeastern corner. The peaks in the Garnet Range extend from 6,000 to 7,000 feet (1,830 to 2,135 m) above sea level. Racetrack Peak and Twin Peaks are the highest peaks in the Flint Creek Range with elevations of 9,283 and 9,067 feet (2,830 and 2,764 m), respectively. The highest peaks in the survey area are in the Anaconda Range at the Continental Divide at elevations of approximately 10,000 feet (3,050 m).

The Clark Fork River drains the survey area. Flint Creek drains the southern portion of the soil survey area, flowing into the Clark Fork River at Drummond. Rock Creek drains the Sapphire Mountains and northern John Long Mountains, flowing into the Clark Fork River at Clinton. Upper and Lower Willow Creeks drain the central and southern John Long Mountains. Clark Fork River tributaries that drain the Garnet Range include Bert and Morris Creeks, the creeks in Edwards and Rattler Gulches, and Tenmile, Little Bear, Ryan, and Cramer Creeks.

Geology

The survey area had an extremely complex and active geologic history. Because of its great mineral wealth, the survey area has been mapped and studied extensively. However, because of the complexity of the geology, not all of the geologic maps agree. Formation names for rock units of similar ages are different in several of the mountain ranges, and the structural geology is not completely understood.

The geologic history of the Granite County Area began approximately 1.5 billion years ago in the Precambrian Era with the deposition of a very thick sequence of sedimentary rocks known as the Belt Supergroup. The sedimentary rocks were deposited into a long, narrow basin containing exposed mudflats; small beaches; and shallow, probably brackish, water. Whether the basin was completely enclosed or the extension of a larger sea has not yet been determined. As the sediments accumulated, the basin subsided. Some estimates place the total

thickness of Belt rocks at approximately 60,000 feet (18 km) (Smith, 1983).

Alternate periods of deposition and erosion have occurred with changing sea levels since the Precambrian Era, depositing a thick sedimentary sequence of interbedded sandstone, shale, and limestone. Sandstone was deposited on beach and near-shore environments; shale was deposited in lower energy, deep-water environments; and limestone was normally formed in warm, shallow water.

Much of Montana was above sea level for long periods. These periods included the early-Cambrian, 570 to approximately 550 million years ago (mya), the Ordovician and Silurian (508 to 505 mya), and the upper-Triassic through mid-Jurassic (220 to 175 mya). Erosion occurring during these periods created disconformities, or gaps, in the geologic record, although strata have been mapped in the Granite County Area from every geologic period except those listed above.

The geologic record contains evidence for at least three major periods of tectonism, or mountain building. These periods occurred during the early-Cambrian Period, the late-Cretaceous Period (90 to 70 mya), and the early-Eocene Epoch of the Tertiary Period (approximately 50 mya). Ongoing seismic activity indicates that tectonic forces are still active in this region.

The prominent structural features visible today began forming approximately 90 million years ago, in the late-Cretaceous Period. At that time, a collision between major tectonic plates to the west created compressional forces that formed the Rocky Mountains. This regional northeastern-southwestern compression resulted in large-scale folding and faulting. Relatively thin sheets of Belt rocks were thrust up over younger sedimentary rocks in a series of imbricate (overlapping) faults. Accompanying the large-scale faults are numerous closely-spaced thrust faults with minor displacement. The thrust planes were subsequently folded, overturned, and faulted again.

The survey area lies within the Sapphire Tectonic Block, a large thrust block that has been displaced an estimated 50 miles (80 km) from the west. The Garnet Range on the north, the Flint Creek Range on the east, and the Anaconda Range on the south define the limits of the Sapphire Tectonic Block. The orientation of fold axes and many of the faults parallels the orientation of these mountain ranges.

During the Cretaceous tectonism, deep-seated melting created masses of magma that rose into the

upper crust. As the magma rose, it deformed the surrounding sedimentary formations, lubricated planes of thrust faulting, and, in many areas, mineralized the surrounding rock. Some of the magma rose to the surface, forming extrusive as well as intrusive igneous rocks. Associated with the large igneous bodies are smaller pods, sills, and dikes.

Numerous stocks and batholiths occur in this survey area, most with a granitic composition. Stocks are igneous intrusions that are less than 40 square miles (100 square km) in surface exposure; batholiths are larger. Hydrothermal activity occurring as these intrusions cooled formed a variety of mineral deposits. The county is well named, as the granitic intrusions are responsible for the rich mineral deposits and, consequently, much of the county's history and development.

Radiometric dating has been performed on many of the igneous bodies in this survey area. The Garnet Stock, at the northern county border, has been dated at about 82 million years, and the Philipsburg Batholith, east of Philipsburg, has been dated at 79 to 73 million years (Weidman, 1988). The Sapphire Batholith, in the southwest corner of the county, has been dated at 73 million years (Tysdal and others, 1988).

Mountain building continued into Tertiary time, when volcanism and erosion formed extensive basin-fill deposits. Great volumes of sediment were washed into the valleys as the surrounding mountains were uplifted. Volcanic eruptions to the west blanketed the survey area with volcanic ash that was also washed into the valleys. The summit surface of the Garnet Range has very low relief and is considered an early-Tertiary Penplain, a surface that was eroded to a nearly level plain.

During the ice ages of the Pleistocene Epoch (1.6 to 10,000 mya), four separate glacial events are known to have affected the Flint Creek Range (Rowan and others, 1991). During these ice ages, alpine glaciers covered the high peaks, eroded U-shaped valleys, and deposited linear moraines and glacial outwash in many valleys. Multiple glacial events also occurred in the Anaconda Range. However, the Garnet, John Long, and Sapphire Ranges have no glacial deposits and were probably too low to be affected by the ice.

In the Philipsburg area, glaciers extended from the crest of the Flint Creek Range primarily north and west into the Philipsburg Valley. Glacial moraines occupy large areas along the valleys of Flint and Fred Burr Creeks. In the southwestern portion of the soil survey area, moraines occur in the West, Muddy, East, and Ross Forks of Rock Creek. The moraines

are hummocky, unsorted deposits that cover the valley bottoms and extend up adjacent slopes.

The sequence of rocks exposed in the Granite County Area is summarized below, listed in order of decreasing age. Systems are the rocks deposited during a particular geologic period. Formations are defined as a succession of strata distinctive enough to constitute a basic unit for mapping, identified by similar rock type and stratigraphic position. Formations can be combined into groups or subdivided into members.

In many cases, outcrop areas for individual formations are small and difficult to differentiate in the field. In these cases, no formation names are listed.

Precambrian System (2.5 bya to 570 mya). The oldest rocks in the Granite County Area belong to the Belt Supergroup, which contains two groups of weakly metamorphosed sedimentary formations. These formations consist of green, purple, gray, and tan argillite (slightly metamorphosed mixtures of silt and clay); white, gray, brown, and reddish quartzite; and limestone and dolomite (magnesium-bearing limestone). The Belt rocks are commonly thinly bedded, and, because they were only lightly metamorphosed, many of their original sedimentary features, such as ripple marks and mud cracks, are well preserved.

Paleozoic System (570-245 mya). Cambrian-aged rocks consisting of quartzite and limestone with interbedded shale occur in thicknesses of up to 2,000 feet (610 m). These rocks have been divided into the Flathead, Silver Hill, Hasmark, and Red Lion Formations. Commercial-grade manganese is mined from dolomite of the Hasmark Formation.

Devonian-aged (408-360 mya) rocks consist of thin-bedded calcareous shale, limestone, and distinctive yellow-stained sandstone of the Maywood Formation. Dark-colored limestones of the Jefferson Formation overlay these rocks.

Mississippian-aged (360-320 mya) rocks consist of thick, cliff-forming limestone with lesser amounts of dolomite and shale from the Madison Group. These rocks have been subdivided in some areas into the lower, thin-bedded Lodgepole Formation and the upper, massive Mission Canyon Formation.

The Pennsylvanian Period (320-286 mya) is represented by sandstone and limestone of the Amsden Formation, overlain by quartzite of the Quadrant Formation.

The Permian Period (286-245 mya) is represented by the Phosphoria Formation. This formation consists of chert, phosphatic sandstone, and limestone. Phosphate occurs as a thin, black bed near the bottom of this formation. Until recently, the last

underground phosphate mine in the United States was working this deposit, however it closed its operations in April 1993.

Mesozoic System (245-66 mya). The Jurassic Period (208-144 mya) is represented by the Ellis Group, which has been subdivided into the Sawtooth, Rierdon, Swift, and Morrison Formations. Dark-gray to gray-green calcareous shale dominates the Ellis Group. The Ellis group contains lesser amounts of limestone and thin-bedded sandstone than the rocks of the Paleozoic System.

The Cretaceous Period (144-66 mya) is represented by a thick sequence of alternating layers of sandstone and shale. These rocks were deposited on coastal plains and a shallow sea floor during alternating periods of emergence and submergence.

The oldest Cretaceous-aged unit is the Kootenai Formation, which consists of thick basal sandstone overlain by interbedded limestone and gray, red, and maroon shale. This formation has been subdivided into four members in the Granite County Area, including basal gastropod-rich (fossil snails) limestone that is quarried near Drummond.

The Colorado Group directly overlies the Kootenai Formation and consists primarily of dark-gray shale. Where undisturbed, this shale can be up to 2,000-foot (610-m) thick. However, this shale has limited surface exposure in the Granite County Area. The oldest formation in the group, the Blackleaf Formation, is transitional between the Kootenai and the overlying sequence of thick shales. The Blackleaf Formation contains black to dark-gray shale with hard interbeds of sandstone and limestone.

Overlying the Blackleaf Formation, the Colorado Group has been subdivided into the Coberly, Jens, Carten Creek, and Golden Spike Formations. These formations consist of siltstone and silty sandstone with interbeds of shale and volcanic ash. These formations have been mapped in the Deer Lodge Valley but are not exposed in the Garnet or Flint Creek Ranges.

Igneous activity began in the late-Cretaceous Period and continued into the Tertiary Period. Both extrusive and intrusive rock types occur in the soil survey area.

Cenozoic System (66 mya to present). Extensive volcanic activity continued into the early-Tertiary Period (66 mya to approximately 24 mya). Large volcanic fields were formed in the Garnet and Sapphire Ranges. The major igneous intrusions include the Garnet Stock in the Garnet Range and the Sapphire Batholith, which forms the core of the Sapphire Mountains. The granitic plutons occupying the higher, central portion of the Flint Creek Range

include the Mount Powell and Philipsburg Batholiths, the Royal Stock, and the Racetrack Pluton. The Philipsburg Batholith has been subdivided into the Bimetallic Stock to the west and the Dora Thorn Pluton to the east.

Tertiary-aged (66-1.6 mya) sedimentary rocks in the soil survey area consist primarily of basin-fill deposits that are over 6,000-foot (1.8-km) thick between Hall and New Chicago. These deposits consist predominantly of tan-colored silt and fine-grained pyroclastic debris (unconsolidated ash and consolidated tuff which were “broken by fire”) and include interbeds of poorly sorted sand and gravel. These deposits are generally unconsolidated at the surface but become semiconsolidated with depth.

A variety of surficial Quaternary deposits (1.6 mya to present) are located within the soil survey area. These deposits are generally unconsolidated and relatively thin and consist primarily of alluvium, terrace deposits, and glacial till and outwash. Only the major drainages contain significant amounts of Quaternary-aged alluvium.

Mineral and Ground-Water Resources

The survey area lies in a heavily mineralized area; the mining industry has had a significant influence on its development. The first discovery of gold in Montana occurred in the 1850s in the north end of the Flint Creek Range near the mouth of Gold Creek, just east of Granite County. Important lode deposits were discovered in the Philipsburg and Georgetown Districts in the 1860s. The Hope Mine, in the Philipsburg District, was established in 1864, and the first silver mill in Montana was constructed in 1867. Production peaked during the period between 1880 and 1900 and then declined. The Philipsburg district became the country's leading producer of manganese during World War I and continued to be a principal producer until the 1960s. More recently, the Black Pine Mine has been one of the most important underground mines in Montana and has produced silver almost continuously since 1974.

Placer gold has been mined from 16 areas within the county, and production has been small but consistent since the original discovery. The Bearmouth Placer, located at the confluence of Bear Creek and the Clark Fork River, is estimated to have produced \$7,000,000 of gold between 1865 and 1918 (Pardee, 1918).

The most important mining districts in the Flint Creek Range were Philipsburg, Georgetown, Pioneer, Princeton, and Dunkleberg. Principal commodities produced, in order of importance, were silver,

manganese, gold, zinc, lead, copper, phosphate, and tungsten. In the John Long Mountains, the most important areas which produced silver, gold, copper, lead, and tungsten were the Black Pine district and the Henderson Creek area. In the Garnet Range, mining districts which produced gold, silver, and copper included the Bear Creek Placer, Copper Cliff, First Chance, and Top O'Deep Districts. Placer mining for gold and sapphires is ongoing today, as is continued exploration in the gold lode districts of the Garnet and Flint Creek Ranges.

Hundreds of mines and prospects are located in the survey area, and gold has been by far the most important product. In addition, placer deposits of titanium, corundum, and sapphires (gem-quality corundum) and lode deposits of silver, copper, lead, zinc, tungsten, molybdenum, antimony, fluorspar, manganese, barium, phosphates, high-calcium limestone, rare earths, uranium, vermiculite, and pumice have been prospected or mined in the Granite County Area.

There are no oil or gas fields in the survey area. The geology is unfavorable for the occurrence of petroleum resources, and there is very little potential for development. Near Drummond, during 1977-1978, oil and gas test holes were drilled through the overthrust; there were no discoveries.

Because of the geologic nature of this region, there are only limited areas suitable for significant ground-water development. The principal water-bearing formations in the county are unconsolidated alluvium and the Tertiary sediments. The older, consolidated bedrock formations yield only small amounts of water, most of which is developed from fractures or solution channels in limestone. Igneous rocks are normally impermeable, and water can only be developed by intersecting fracture systems. Due to the significant amount of regional folding and faulting, most of the bedrock is fractured to some degree. Water quality is good in the bedrock aquifers.

The Tertiary-aged basin-fill sediments are relatively fine grained and have limited permeability. Most wells have yields of 15-20 gpm (57-76 lpm), although one well in T. 10 N., R. 13 W., Section 32, has a reported yield of 300 gpm (1,135 lpm) with a total depth of 60 feet (18 m). Yield is highly variable and dependent on the amount of sand and gravel lenses penetrated and their degree of interconnection. Water quality is suitable for household, stock, and irrigation use, although the water is somewhat hard and can have high concentrations of iron and manganese.

Unconsolidated alluvium is the most widely used aquifer in the survey area. Several large capacity

wells with yields of 200 to 500 gpm (756 to 1,890 lpm) have been drilled in these deposits. Water quality is good to excellent.

The northern portion of the Granite County Area, including the Garnet Range, has potential for low- to moderate-temperature geothermal development. Documented occurrences of geothermal activity are restricted to the northern portion of the survey area, which contains several springs with surface discharge temperatures of 20 to 25 degrees C. While this survey area has been recognized as having potential for low- to moderate-temperature geothermal development, only minimal development of these resources has occurred.

Well use, current to June 1993, for the Granite County Area is summarized below. This information was provided by the Montana Ground Water Information Center's Water Well Database. Often, wells have multiple uses and are listed under both domestic and stockwater supplies, so the total appears to be less than the sum of the uses. Twenty-one wells have reported yields of 105 gpm (400 lpm) or more.

TOTAL WELLS	881
Domestic	717
Stockwater	127
Other	18
Irrigation	16
Commercial	15
Recreational	9
Industrial	7
Public Supply	7
Institutional	3
Unused	2

Seismicity

The Granite County Area is located within the intermountain seismic belt, although its seismic activity is relatively quiet for this region. The intermountain seismic belt extends from southern Nevada north to Flathead Lake and is characterized by shallow seismicity, earthquake swarms, and normal fault scarps with evidence of Quaternary or historic movement.

Seismicity information provided by the Earthquake Studies Office of the Montana Bureau of Mines and Geology shows 80 earthquakes, with a maximum of 3.1 and an average of 1.8 magnitude on the Richter Scale, recorded in the survey area between 1982 and 1992. Microearthquakes are earthquakes with magnitudes of 2.0 or less. Microearthquakes are not commonly felt and are recorded only on local

seismographs. Earthquakes with magnitudes under 4.5 generally do not cause significant damage.

Climate

The soil survey area, located along the western slopes of the Continental Divide, is quite irregular in topography. The area experiences large variations in climate within short distances, typical of mountain-valley landscapes.

Granite County Area has marked seasonal variations, typical of Montana's counties situated near or along the Continental Divide. A pronounced difference in precipitation exists between mountain and valley areas.

The valleys are relatively dry during the colder months and wetter during late spring and early summer. In the valleys, the moist season usually occurs during May, June, and July. In the mountains, the wettest part of the year is from midwinter to early spring; however, the average pattern is more complicated and, as a result, more variable. At high elevations the wettest periods are fall, winter, and spring. Precipitation during the colder half of the year is often light and steady, sometimes lasting for hours. During the warmer months, showers and thundershowers dominate precipitation events.

Winter months in the northern half of the survey area produce cloudy weather. Nearly all winter precipitation falls as snow. Winters are cold, averaging well below freezing. Summers, although fairly warm, seldom produce oppressive heat, and even the warmest days (most commonly in the 90 degrees F range) are followed by cool nights.

Following this section are tables giving data on temperature and precipitation, probable dates of the first freeze in fall and the last freeze in spring, and data on length of the growing season.

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

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. This 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 survey 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, soil scientists develop a concept, or model, of how the soils were formed. During mapping, this model enables soil scientists to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Individual soils on the landscape commonly merge into one another as their characteristics gradually change. To construct an accurate 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 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, 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 data from these analyses and tests as well as field-observed characteristics and 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 for crop yields under high levels of management are modeled and validated with farm records and field or plot information 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, 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.

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 result from 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.

Temperature and Precipitation

(Recorded in the period 1963-1990 at Drummond and Philipsburg, Montana)

Month	Temperature (Degrees F)					Precipitation (Inches)					
	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 or More	Average Total Snowfall
				Maximum Temperature More Than	Minimum Temperature Less Than			Less Than	More Than		
						<i>Units</i>					
DRUMMOND:											
January-----	31.1	11.4	21.3	50	-27	1	1.00	0.42	1.49	3	9.5
February-----	38.2	16.0	27.1	57	-23	3	0.58	0.27	0.84	1	5.6
March-----	46.7	21.8	34.3	68	-10	28	0.84	0.47	1.16	3	6.9
April-----	57.7	28.2	42.9	80	11	135	1.04	0.43	1.56	3	5.5
May-----	66.4	35.5	50.9	88	19	346	1.82	0.93	2.59	5	2.6
June-----	74.9	43.0	59.0	93	29	567	1.94	0.96	2.79	5	0.1
July-----	84.2	45.5	64.8	97	33	766	1.16	0.35	1.83	3	0.0
August-----	82.9	44.3	63.6	97	31	731	1.37	0.54	2.07	4	0.0
September---	71.8	36.4	54.1	91	19	421	1.21	0.51	1.88	3	0.9
October-----	59.4	28.2	43.8	80	11	160	0.79	0.23	1.25	2	1.6
November----	41.9	20.6	31.3	64	-11	18	0.70	0.39	0.97	2	5.3
December----	31.2	11.7	21.5	52	-27	2	0.92	0.51	1.29	3	8.9
Yearly:											
Average----	57.2	28.6	42.9	—	—	—	—	—	—	—	—
Extreme----	101.0	-43.0	—	98	-35	—	—	—	—	—	—
Total-----	—	—	—	—	—	3,178	13.38	10.49	15.75	37	47.0
PHILIPSBURG:											
January-----	32.3	13.0	22.7	52	-28	3	0.69	0.32	1.01	2	11.0
February-----	37.6	16.7	27.2	57	-22	5	0.47	0.19	0.71	1	5.9
March-----	43.4	20.2	31.8	64	-12	19	0.82	0.50	1.11	3	9.9
April-----	53.1	26.2	39.6	75	7	90	1.35	0.72	1.92	4	5.9
May-----	61.7	32.9	47.3	83	18	243	2.36	1.37	3.25	6	2.0
June-----	71.0	39.7	55.4	90	26	459	2.27	1.22	3.20	6	0.0
July-----	80.3	42.2	61.3	93	29	658	1.24	0.50	1.87	3	0.0
August-----	79.6	41.2	60.4	94	28	629	1.62	0.61	2.46	4	0.0
September---	68.7	33.8	51.3	88	15	349	1.47	0.48	2.29	4	0.3
October-----	58.5	27.8	43.1	79	7	157	1.00	0.40	1.56	2	1.3
November----	42.0	20.8	31.4	66	-11	26	0.67	0.35	0.95	2	5.5
December----	33.3	13.9	23.6	55	-25	5	0.67	0.30	0.98	2	7.9
Yearly:											
Average----	55.1	27.4	41.2	—	—	—	—	—	—	—	—
Extreme----	98.0	-38.0	—	95	-33	—	—	—	—	—	—
Total-----	—	—	—	—	—	2,644	14.64	11.92	17.14	39	49.6

* 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 (Threshold: 40.0 degrees F).

Freeze Dates in Spring and Fall

(Recorded in the period 1963-1990 at Drummond and Philipsburg, Montana)

Probability	Temperature		
	24 degrees F or lower	28 degrees F or lower	32 degrees F or lower
DRUMMOND:			
Last freezing temperature in spring: January-July			
1 year in 10 later than---	May 20	June 9	July 1
2 years in 10 later than---	May 15	June 3	June 24
5 years in 10 later than---	May 6	May 22	June 9
First freezing temperature- in fall: August-December			
1 year in 10 earlier than--	September 14	September 6	August 19
2 years in 10 earlier than-	September 19	September 10	August 25
5 years in 10 earlier than-	September 28	September 19	September 4
PHILIPSBURG:			
Last freezing temperature in spring: January-July			
1 year in 10 later than---	June 2	July 1	July 24
2 years in 10 later than---	May 26	June 23	July 17

Growing Season

(Recorded in the period 1963-1990 at Drummond and Philipsburg, Montana)

Probability	Daily Minimum Temperature		
	Higher than 24 degrees F	Higher than 28 degrees F	Higher than 32 degrees F
	<i>Days</i>	<i>Days</i>	<i>Days</i>
DRUMMOND:			
9 years in 10-----	123	94	56
8 years in 10-----	130	102	66
5 years in 10-----	143	118	85
2 years in 10-----	157	133	104
1 year in 10-----	164	142	114
PHILIPSBURG:			
9 years in 10-----	106	63	28
8 years in 10-----	113	73	36
5 years in 10-----	127	91	52
2 years in 10-----	141	109	67
1 year in 10-----	148	119	76

Formation and Classification of the Soils

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

Formation of the Soils

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 factors. These factors are the effect of climate on the parent material, the kinds of plants and organisms living in the soil, the relief of the land, the physical and chemical composition of the parent material, and the length of time it took for the soil to form.

Within short distances, the combination of these factors varies, and, consequently, the soils that form differ in fertility, productivity, and physical and chemical characteristics. In the following paragraphs, the factors of soil formation are discussed as they relate to the soils in the Granite County Area.

Climate

Temperature and precipitation mainly determine climate, an active force in the formation of soils. In the Granite County Area, winters are cold; springs are cool and moist; and summers are warm and dry. Seasonal weather patterns include arctic cold waves and gusty warm southwest winds, called Chinooks. Soils form in rocks that have been broken into suitable materials by erosion and alternate freezing and thawing. Chemical reactions, such as solution and hydration, further break down this weathered material.

Precipitation and temperature affect the kind and amount of vegetation that grows on the soil. Vegetation decays to produce organic matter in the

soil. Soils that have cool temperatures and high precipitation generally contain more organic matter and are dark colored. Soils that have warm temperatures and low precipitation generally contain less organic matter and are light colored.

In the survey area, the mean annual precipitation ranges from 10 to 30 inches. The mean annual temperature ranges from 34 to 44 degrees F.

Living Organisms

Living organisms are active in the formation of soils. Plants, animals, insects, and microorganisms affect gains or losses in organic matter, plant nutrients in the soil, and changes in porosity and structure.

Roots, rodents, and insects penetrate the soil and alter its structure. Microorganisms, chemicals in the soil, and insects change leaves, roots, and entire plants that remain in the surface layer to humus. Fungi and algae also contribute to the decomposition of bedrock. Animals increase porosity by burrowing through the soil and leaving open channels for the movement of water and air. Common rodents in the survey area are badger, ground squirrel, and rabbit.

Vegetation in this survey area consists mainly of short grasses, mid grasses, and shrubs in the valleys and coniferous forests in the Garnet, John Long, Sapphire, Flint Creek, and Anaconda Mountain Ranges.

Topography

Topography, or relief, is determined by glaciation and mountain formation and by the age and resistance of geologic formations to erosion by wind and water. Topography influences soil development through its effect on drainage and runoff. On the terrace edges of this survey area, runoff water has carved drainages. These rugged areas contrast sharply with the smoother areas of the terrace surfaces.

The number and distinctness of soil horizons generally decrease as slope increases. Soils on steep slopes with rapid runoff have many

characteristics similar to those of soils formed in arid climates. Examples of this general principle are the Sixbeacon soil that is moderately steep or steep and the Ekah soil that is nearly level to moderately sloping.

Parent Material

Most of the soils in the survey area formed in alluvium derived from mixed sources or from material weathered from bedrock. Types of this bedrock include andesite, argillite, basalt, granite, limestone, quartzite, rhyolite, sandstone, and shale.

Soils, such as the Elve and the Libeg series, that formed in argillites and quartzites are generally loamy. Soils, such as the Ambrant and the Comad series, that formed in materials weathered from granite are generally sandy. Soils, such as the Con and the Danvers series, that formed in mixed alluvium are either clayey or loamy.

Many soils in the survey area have accumulated lime from the parent material. Lime affects the availability of plant nutrients, especially phosphorus.

Time

Change taking place in soils over a long period is called soil genesis. As a result of these changes, distinct horizons, or layers, develop in the soils. 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 kind and arrangement of these horizons are called soil morphology. These layers are described in terms of chemistry, color, consistence, permeability, structure, texture, and thickness.

Soils are classified according to their approximate age, from young to mature. Age, or maturity, of a soil is generally indicated by the thickness and distinctness of subsurface horizons, content of organic matter and clay, depth to which soluble material is leached, and form and distribution of calcium carbonate and gypsum in the soil.

Young soils show very little profile development. Canarway gravelly sandy loam, a soil of the Entisol order, is an example of a young soil. It is on a flood plain adjacent to a stream. The soil has accumulated enough organic matter to form a thin A horizon but has little clay accumulation and little translocation of carbonates within the profile.

The Gregson soil formed in parent material that is similar to the parent material of the Canarway gravelly sandy loam but is older. These soils also

formed in alluvium on flood plains and older, more stable, alluvial fans and stream terraces. They have accumulated enough organic matter to have a thick, dark-colored A horizon; a Bw horizon with good soil structure to 26 inches; and nearly all of the carbonates leached from the entire profile.

Many of the sloping and steep, shallow, and very shallow soils appear to have been in the process of formation for about as long as some of the more developed, less sloping soils. However, erosion has removed the soil as fast as it formed. In this case, the effect of time has been offset by the effect of relief.

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 table, "Classification of the Soils," shows the classification of the soils in the survey area. 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, from *mollis*, meaning soft.

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. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic 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 Typic Argiustolls.

SERIES. The series consists of soils within a family that have horizons similar in arrangement in the profile, color, consistence, mineral and chemical composition, reaction, structure, and texture. An example is the Clasoil series. The Clasoil series is a fine-loamy, mixed, superactive, frigid Typic Argiustoll.

Soil Series and Detailed Soil Map Units

In this section, arranged in alphabetical order, each soil series recognized in the survey area is described. Each description is followed by the detailed soil map units associated with the series.

Characteristics of the soil and the material in which it formed are identified for each soil series. A pedon, a small three-dimensional area of soil, that is typical of the series 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 defined in "Soil Taxonomy" (Soil Survey Staff, 1999). Unless otherwise stated, colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the series.

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 mentioned in the map unit descriptions. 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 of the soils and miscellaneous areas on the landscape.

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

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

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all of 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, Roy cobbly loam, 2 to 4 percent slopes, is a phase of the Roy 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.

This survey includes *complexes*. They consist 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. Varney-Con loams, 4 to 8 percent slopes, is an example.

This survey includes *miscellaneous areas*. They have little or no soil material and support little or no vegetation. Rock outcrop is an example.

The "Acreage and Proportionate Extent of the Soils" table in Parts I and II of the manuscript gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. Many of the terms used in describing the soils or miscellaneous areas are defined in the "Glossary."

Albicalis Series

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly drained

Permeability: Moderate

Landform: Flood plains

Parent material: Alluvium

Slope range: 0 to 2 percent

Elevation range: 3,600 to 5,400 feet

Annual precipitation: 10 to 14 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 90 to 105 days

Taxonomic Class: Fine-loamy, mixed, superactive, nonacid, frigid Aeric Fluvaquents

Typical Pedon

Albicalis loam, 0 to 2 percent slopes, rarely flooded, in an area of native grassland, 800 feet south and 1,600 feet west of the northeast corner of sec. 19, T. 11 N., R. 14 W.

A—0 to 8 inches; grayish brown (10YR 5/2) loam, light brownish gray (10YR 6/2) dry; many fine prominent red (2.5YR 4/6) and red (2.5YR 5/6) dry redox concentrations; weak fine granular structure; soft, very friable, nonsticky, slightly

plastic; many fine and very fine and few medium roots; slightly alkaline; gradual wavy boundary.

C1—8 to 20 inches; grayish brown (10YR 5/2) loam consisting of strata of loamy sand, silt loam, and fine sandy loam, light brownish gray (10YR 6/2) dry; many fine prominent red (2.5YR 4/6) and red (2.5YR 5/6) dry redox concentrations; weak fine subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many fine and very fine roots; common very fine and fine tubular pores; slightly alkaline; gradual wavy boundary.

C2—20 to 32 inches; dark grayish brown (10YR 4/2) silt loam consisting of strata of loam and fine sandy loam, light gray (10YR 7/2) dry; few fine prominent red (2.5Y 4/6) and red (2.5YR 5/6) dry redox concentrations; massive; slightly hard, very friable, moderately sticky, slightly plastic; many fine and very fine roots; few very fine irregular pores; slightly alkaline; gradual wavy boundary.

Cg1—32 to 42 inches; very dark gray (10YR 3/1) loam consisting of strata of loam and silty clay loam, gray (10YR 6/1) dry; massive; slightly hard, friable, moderately sticky, slightly plastic; many fine and very fine roots; few very fine irregular pores; slightly alkaline; gradual wavy boundary.

Cg2—42 to 60 inches; very dark gray (10YR 3/1) loam consisting of strata of loam and silty clay loam, gray (10YR 5/1) dry; massive; slightly hard, friable, moderately sticky, slightly plastic; few fine and very fine roots; few very fine irregular pores; slightly alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the seasonal high water table: 12 to 24 inches

Note: Some pedons have a lithologic discontinuity between 40 and 60 inches.

A horizon

Value: 3 to 5 moist; 5 or 6 dry

Chroma: 1 or 2

Redox concentrations: Abundance—none to many; Value—5 or 6 dry; 3 or 4 moist

Clay content: 18 to 27 percent

Reaction: pH 7.4 to 8.4

C1 horizon

Value: 4 or 5 moist; 5 or 6 dry

Chroma: 2 or 3

Redox concentrations: Abundance—common or many; Value—4 to 6 dry; 3 or 4 moist

Texture: Loam or clay loam consisting of strata of silt loam, fine sandy loam, loamy sand, loam, and clay loam

Clay content: 18 to 35 percent

Reaction: pH 7.4 to 7.8

C2 horizon

Value: 4 or 5 moist; 5 to 7 dry

Chroma: 2 or 3

Redox concentrations: Abundance—common or many; Value—4 to 6 dry; 3 or 4 moist

Texture: Silt loam, loam, or clay loam consisting of strata of silt loam, fine sandy loam, loam, and clay loam

Clay content: 18 to 35 percent

Calcium carbonate equivalent: 0 to 10 percent

Reaction: pH 7.4 to 8.4

Cg1 horizon

Value: 3 to 5 moist; 5 or 6 dry

Chroma: 1 to 3

Redox concentrations: Abundance—none to many; Value—5 or 6 dry, 4 or 5 moist;

Chroma—4, 6, or 8

Texture: Loam or silty clay loam consisting of strata of silt loam, clay loam, and fine sandy loam

Clay content: 18 to 35 percent

Calcium carbonate equivalent: 0 to 10 percent

Reaction: pH 7.4 to 8.4

Cg2 horizon

Hue: 5Y, 10YR, or 2.5Y

Value: 3 to 5 moist; 5 or 6 dry

Chroma: 1 or 2

Redox concentrations: Abundance—none to many; Hue—2.5Y or 10YR; Value—5 or 6 dry, 4 or 5 moist; Chroma—4 or 6

Texture: Loam or sandy loam consisting of strata of loamy sand, sand, sandy clay loam, and silty clay loam

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 45 percent—0 to 10 percent cobbles; 0 to 35 percent pebbles

Calcium carbonate equivalent: 0 to 10 percent

Reaction: pH 7.4 to 8.4

12A—Albicalis loam, 0 to 2 percent slopes, rarely flooded

Setting

Landform: Flood plains

Position on landform: Treads

Slope: 0 to 2 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Albicalis and similar soils: 85 percent

Minor Components

Mccabe and similar soils: 0 to 5 percent

Canarway and similar soils: 0 to 5 percent

Areas of riverwash: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Apparent

Available water capacity: Mainly 10.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

112A—Albicalis loam, impacted, 0 to 2 percent slopes, occasionally flooded

Setting

Landform: Flood plains

Position on landform: Treads

Slope: 0 to 2 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Albicalis and similar soils: 85 percent

Minor Components

Flintcreek and similar soils: 0 to 5 percent

Areas of riverwash: 0 to 5 percent

Nythar and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly drained

Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Water table: Apparent
Available water capacity: Mainly 10.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Ambrant Series

Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Permeability: Moderately rapid
Landform: Mountains
Parent material: Material weathered from intrusive igneous rocks
Slope range: 4 to 80 percent
Elevation range: 3,600 to 6,200 feet
Annual precipitation: 18 to 22 inches
Annual air temperature: 38 to 42 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Coarse-loamy, mixed, superactive, frigid Lamellic Haplustepts

Typical Pedon

Ambrant coarse sandy loam, in an area of Ambrant-Rochester complex, 15 to 35 percent slopes, in an area of woodland, 300 feet south and 500 feet east of the northwest corner of sec. 8, T. 7 N., R. 15 W.

E1—0 to 6 inches; light brownish gray (10YR 6/2) coarse sandy loam, dark grayish brown (10YR 4/2) moist; moderate medium granular structure; soft, friable, slightly sticky, nonplastic; many very fine and fine and few coarse roots; many fine tubular pores; 5 percent pebbles; slightly acid; clear smooth boundary.

E2—6 to 14 inches; grayish brown (10YR 5/2) coarse sandy loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; soft, friable, slightly sticky, nonplastic; many very fine and fine and few coarse roots; many fine tubular pores; 5 percent pebbles; neutral; clear wavy boundary.

E and Bt—14 to 37 inches; E part (80 percent) is grayish brown (10YR 5/2) coarse sandy loam, dark grayish brown (10YR 4/2) moist; B part

(20 percent) is grayish brown (10YR 4/2) coarse sandy loam lamellae, 1/8- to 1/4-inch thick, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky, nonplastic; many very fine and fine roots; many very fine and fine tubular pores; 5 percent pebbles; neutral; gradual wavy boundary.

2C—37 to 60 inches; light brownish gray (10YR 6/2) gravelly coarse sandy loam; dark grayish brown (10YR 4/2) moist; massive; hard, friable, slightly sticky, nonplastic; common very fine and fine roots; common very fine and fine tubular pores; 10 percent pebbles and 5 percent cobbles; neutral.

Range in Characteristics

Soil temperature: 42 to 47 degrees F

Moisture control section: Between 8 and 24 inches

E1 horizon

Value: 5 to 7 dry; 3 or 4 moist

Chroma: 2 or 3

Texture: Sandy loam or coarse sandy loam

Clay content: 5 to 15 percent

Content of rock fragments: 5 to 15 percent pebbles

Reaction: pH 5.6 to 7.3

E2 horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 1 to 3

Texture: Sandy loam or coarse sandy loam

Clay content: 5 to 15 percent

Content of rock fragments: 5 to 15 percent pebbles

Reaction: pH 5.6 to 7.3

E and Bt horizon

Hue: 10YR or 2.5Y

Value: E part—5 to 7 dry, 4 to 6 moist; B part—4 or 5 dry, 3 or 4 moist

Chroma: 2 or 3

Texture: Sandy loam or coarse sandy loam

Clay content: 5 to 18 percent

Content of rock fragments: 5 to 15 percent pebbles

Reaction: pH 5.6 to 7.3

2C horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 1 to 4

Clay content: 0 to 5 percent
 Content of rock fragments: 15 to 30 percent—5 to 15 percent cobbles; 10 to 15 percent pebbles
 Reaction: pH 5.6 to 7.3

179D—Ambrant-Rochester complex, 4 to 15 percent slopes

Setting

Landform:

- Ambrant—Mountains
- Rochester—Mountains

Position on landform:

- Ambrant—Foothills and toeslopes
- Rochester—Foothills and toeslopes

Slope:

- Ambrant—4 to 15 percent
- Rochester—4 to 15 percent, southwest aspect

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 18 to 22 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Ambrant and similar soils: 50 percent
 Rochester and similar soils: 35 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
 Elve and similar soils: 0 to 5 percent
 Soils that have clayey skeletal subsoils: 0 to 5 percent

Major Component Description

Ambrant

Surface layer texture: Sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Material weathered from intrusive igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.1 inches

Rochester

Surface layer texture: Very stony sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Excessively drained
Dominant parent material: Material weathered from intrusive igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

179E—Ambrant-Rochester complex, 15 to 35 percent slopes

Setting

Landform:

- Ambrant—Mountains
- Rochester—Mountains

Position on landform:

- Ambrant—Backslopes and foothills
- Rochester—Backslopes and foothills

Slope:

- Ambrant—15 to 35 percent
- Rochester—15 to 35 percent, southwest aspect

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 18 to 22 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Ambrant and similar soils: 50 percent
 Rochester and similar soils: 35 percent

Minor Components

Soils that have clayey skeletal subsoils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent
 Elve and similar soils: 0 to 5 percent

Major Component Description

Ambrant

Surface layer texture: Sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Material weathered from intrusive igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.1 inches

Rochester

Surface layer texture: Very stony sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Excessively drained
Dominant parent material: Material weathered from intrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

179F—Ambrant-Rochester complex, 35 to 60 percent slopes

Setting

Landform:

- Ambrant—Mountains
- Rochester—Mountains

Position on landform:

- Ambrant—Backslopes and shoulders
- Rochester—Backslopes and shoulders

Slope:

- Ambrant—35 to 60 percent
- Rochester—35 to 60 percent, southwest aspect

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 18 to 22 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Ambrant and similar soils: 50 percent

Rochester and similar soils: 35 percent

Minor Components

Elve and similar soils: 0 to 5 percent

Soils that have clayey skeletal subsoils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Major Component Description

Ambrant

Surface layer texture: Sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Material weathered from intrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.1 inches

Rochester

Surface layer texture: Very stony sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Excessively drained

Dominant parent material: Material weathered from intrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Baggs Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderately rapid

Landform: Alluvial fans and stream terraces

Parent material: Alluvium

Slope range: 0 to 15 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Coarse-loamy, mixed, superactive, frigid Typic Haplustolls

Typical Pedon

Baggs loam, 8 to 15 percent slopes, in an area of rangeland, 100 feet north and 200 feet west of the southeast corner of sec. 16, T. 7 N., R. 15 W.

A—0 to 10 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky, moderately plastic; many very fine and fine roots; many very fine irregular pores; neutral; clear smooth boundary.

Bw1—10 to 16 inches; light yellowish brown (10YR 6/4) loam, dark yellowish brown (10YR 3/4) moist; weak medium subangular blocky structure; soft, friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine tubular pores; neutral; clear smooth boundary.

Bw2—16 to 22 inches; light yellowish brown (10YR 6/4) loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; soft, friable, nonsticky, nonplastic; common fine and very fine roots; common very fine tubular pores; neutral; clear wavy boundary.

BC—22 to 31 inches; light brown (7.5YR 6/4) fine sandy loam, brown (7.5YR 4/4) moist; weak coarse subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; few very fine and fine roots; few very fine tubular pores; neutral; gradual wavy boundary.

C—31 to 60 inches; light brown (7.5YR 6/4) fine sandy loam, strong brown (7.5YR 4/6) moist; massive; slightly hard, friable, nonsticky, nonplastic; few fine and very fine roots, few very fine tubular pores; neutral.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 8 and 24 inches

Thickness of the mollic epipedon: 7 to 16 inches

A horizon

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 1 to 3

Clay content: 5 to 18 percent

Reaction: pH 6.6 to 7.3

Bw horizons

Value: 5 or 6 dry; 3 to 5 moist

Chroma: 3, 4, or 6

Texture: Loam or sandy loam

Clay content: 5 to 18 percent

Content of rock fragments: 0 to 15 percent pebbles

Reaction: pH 6.6 to 7.3

BC horizon

Hue: 10YR or 7.5YR

Value: 6 or 7 dry; 4 to 6 moist

Chroma: 3 or 4

Texture: Loam, fine sandy loam, or sandy loam

Clay content: 5 to 18 percent

Content of rock fragments: 0 to 15 percent pebbles

Reaction: pH 6.6 to 7.3

C horizon

Hue: 10YR or 7.5YR

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 4 or 6

Texture: Fine sandy loam, sandy loam, or loam

Clay content: 5 to 18 percent

Content of rock fragments: 0 to 15 percent pebbles

Reaction: pH 6.6 to 7.3

135B—Baggs loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Toeslopes

Slope: 0 to 4 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Baggs and similar soils: 85 percent

Minor Components

Quigley and similar soils: 0 to 10 percent

Sarbo and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

135D—Baggs loam, 8 to 15 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Footslopes and toeslopes

Slope: 8 to 15 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Baggs and similar soils: 85 percent

Minor Components

Quigley and similar soils: 0 to 10 percent

Sarbo and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Bandy Series

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly drained

Permeability: Moderate above the 2C horizon, rapid in the 2C horizon

Landform: Stream terraces and flood plains

Parent material: Loamy alluvium that is 12 to 20 inches over sand and gravel

Slope range: 0 to 4 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 10 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 105 days

Taxonomic Class: Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Endoaquolls

Typical Pedon

Bandy loam, 0 to 4 percent slopes, rarely flooded, in an area of pasture, 1,400 feet south and 1,800 feet east of the northwest corner of sec. 24, T. 11 N., R. 15 W.

Ap—0 to 7 inches; very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) dry; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine and few medium

roots; common fine tubular pores; slightly alkaline; clear smooth boundary.

Bw1—7 to 10 inches; very dark grayish brown (10YR 3/2) sandy loam, dark grayish brown (10YR 4/2) dry; moderate fine subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine and few medium roots; common fine tubular pores; 5 percent pebbles; neutral; clear wavy boundary.

Bw2—10 to 14 inches; very dark grayish brown (10YR 3/2) sandy loam, grayish brown (10YR 5/2) dry; few fine faint yellowish brown (10YR 5/8) and brownish yellow (10YR 6/8) dry redox concentrations; massive; soft, very friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; common very fine irregular pores; 5 percent pebbles; neutral; clear wavy boundary.

2C—14 to 60 inches; grayish brown (10YR 5/2) very gravelly sand, brown (10YR 5/3) dry; few fine faint yellowish brown (10YR 5/8) and brownish yellow (10YR 6/8) dry redox concentrations; single grain; loose, nonsticky, nonplastic; few very fine and fine roots; common very fine irregular pores; 10 percent cobbles, 40 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 8 and 12 inches

Thickness of the mollic epipedon: 10 to 19 inches

Depth to the 2C horizon: 12 to 20 inches

Depth to the seasonal high water table: 12 to 24 inches

Note: Some pedons have a partially decomposed organic matter layer on the surface.

Ap horizon

Value: 3 or 4 dry

Clay content: 15 to 25 percent

Content of rock fragments: 0 to 10 percent—0 to 5 percent cobbles; 0 to 5 percent pebbles

Reaction: pH 6.6 to 7.8

Bw1 horizon

Value: 4 or 5 dry

Chroma: 1 or 2

Texture: Loam, clay loam, or sandy loam

Clay content: 15 to 30 percent

Content of rock fragments: 5 to 35 percent—0 to 5 percent cobbles; 5 to 30 percent pebbles

Reaction: pH 6.6 to 7.8

Bw2 horizon

Redox concentrations: 10YR 6/6, 10YR 6/8 dry; 10YR 5/6, 10YR 5/8 moist

Texture: Loam or sandy loam

Clay content: 5 to 18 percent—30 to 45 percent silt; 55 to 65 percent sand of which 30 to 35 percent is very fine sand
 Content of rock fragments: 5 to 35 percent—0 to 5 percent cobbles; 5 to 30 percent pebbles
 Reaction: pH 6.6 to 7.8

2C horizon

Value: 5 or 6 dry
 Chroma: 2 or 3
 Redox concentrations: 10YR 6/6, 10YR 6/8 dry; 10YR 5/6, 10YR 5/8 moist
 Texture: Sand or loamy sand
 Clay content: 2 to 10 percent
 Content of rock fragments: 35 to 70 percent—5 to 20 percent cobbles; 30 to 50 percent pebbles
 Reaction: pH 6.6 to 7.8

614B—Bandy loam, 0 to 4 percent slopes**Setting**

Landform: Stream terraces
Position on landform: Treads
Slope: 0 to 4 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days

Composition**Major Components**

Bandy and similar soils: 85 percent

Minor Components

Blossberg and similar soils: 0 to 5 percent
 Mannixlee and similar soils: 0 to 5 percent
 Windlass and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Apparent
Available water capacity: Mainly 2.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

814B—Bandy loam, 0 to 4 percent slopes, rarely flooded**Setting**

Landform: Flood plains
Position on landform: Treads
Slope: 0 to 4 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days

Composition**Major Components**

Bandy and similar soils: 85 percent

Minor Components

Blossberg and similar soils: 0 to 5 percent
 Mannixlee and similar soils: 0 to 5 percent
 Poronto and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Apparent
Available water capacity: Mainly 2.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

844A—Bandy-Blossberg complex, 0 to 2 percent slopes, rarely flooded**Setting**

Landform:

- Bandy—Flood plains
- Blossberg—Flood plains

Position on landform:

- Bandy—Treads
- Blossberg—Treads

Slope:

- Bandy—0 to 4 percent
- Blossberg—0 to 4 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days

Composition

Major Components

Bandy and similar soils: 45 percent
 Blossberg and similar soils: 40 percent

Minor Components

Mannixlee and similar soils: 0 to 4 percent
 Poronto and similar soils: 0 to 4 percent
 Flintcreek and similar soils: 0 to 4 percent
 Windlass and similar soils: 0 to 3 percent

Major Component Description

Bandy

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Apparent
Available water capacity: Mainly 3.4 inches

Blossberg

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Apparent
Available water capacity: Mainly 5.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Bata Series

Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Permeability: Moderately slow
Landform: Mountains
Parent material: Colluvium derived from argillite
Slope range: 8 to 35 percent
Elevation range: 5,800 to 7,500 feet
Annual precipitation: 25 to 40 inches

Annual air temperature: 35 to 38 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Andic Glossocryalfs

Typical Pedon

Bata gravelly loam, 15 to 35 percent slopes, in an area of woodland, 200 feet south and 2,250 feet east of the northwest corner of sec. 12, T. 5 N., R. 14 W.

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

Bs—0 to 9 inches; light yellowish brown (10YR 6/4) gravelly loam, dark yellowish brown (10YR 4/4) moist; weak medium granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine and few medium roots; many very fine and fine tubular pores; 30 percent pebbles; moderately acid; clear smooth boundary.

2E—9 to 14 inches; light brown (7.5YR 6/4) very gravelly loam, brown (7.5YR 5/4) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine and few medium roots; common very fine and fine tubular pores; 50 percent pebbles; moderately acid; clear smooth boundary.

2E/Bt—14 to 20 inches; E part (70 percent) is light brown (7.5YR 6/4) very gravelly loam, brown (7.5YR 5/4) moist; B part (30 percent) is very pale brown (10YR 7/4) gravelly loam, yellowish brown (10YR 5/6) moist; texture mixed is very gravelly clay loam; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine and few medium roots; few very fine irregular pores; 45 percent pebbles and 5 percent cobbles; moderately acid; gradual wavy boundary.

2Bt1—20 to 29 inches; very pale brown (10YR 7/4) very gravelly clay loam, yellowish brown (10YR 5/6) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; few very fine irregular pores; few distinct clay films on faces of peds and lining pores; 40 percent pebbles and 10 percent cobbles; slightly acid; gradual wavy boundary.

2Bt2—29 to 60 inches; very pale brown (10YR 7/4) very gravelly clay loam, yellowish brown (10YR 5/6) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; few very fine irregular pores; continuous prominent

clay films on faces of pedes and lining pores;
45 percent pebbles and 10 percent cobbles;
slightly acid.

Range in Characteristics

Soil temperature: 37 to 40 degrees

Content of clay in the control section: 20 to 35 percent

Content of rock fragments in the control section: 35 to 60 percent

Bs horizon

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 4 or 6

Clay content: 5 to 15 percent

Content of rock fragments: 15 to 35 percent—0 to 5 percent cobbles and stones; 15 to 30 percent pebbles

Acid oxylate extractable Al + 1/2 Fe: Greater than 1.0 percent

Moist bulk density: 1.0 g/cm³ or less

Reaction: 5.1 to 6.5

2E horizon

Value: 5 or 6 dry; 4 or 5 moist

Clay content: 20 to 27 percent

Content of rock fragments: 25 to 60 percent—0 to 10 percent cobbles and stones; 25 to 50 percent pebbles

Reaction: 5.6 to 6.5

2E/Bt horizon

Value: E part—6, 7, or 8 dry, 5 or 6 moist; B part—5 to 7 dry, 4 or 5 moist

Chroma: E part—2 to 4; B part—3 or 4

Clay content: 20 to 25 percent

Content of rock fragments: 25 to 60 percent—0 to 10 percent stones and cobbles; 25 to 50 percent pebbles

Reaction: 5.6 to 6.5

2Bt horizons

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 3, 4, or 6

Texture: Clay loam or sandy clay loam

Clay content: 20 to 35 percent

Content of rock fragments: 35 to 60 percent—0 to 10 percent stones and cobbles; 35 to 50 percent pebbles

Reaction: 5.6 to 6.5

66D—Bata gravelly loam, 8 to 15 percent slopes

Setting

Landform: Mountains

Position on landform: Footslopes and toeslopes

Slope: 8 to 15 percent

Elevation: 5,800 to 7,500 feet

Mean annual precipitation: 20 to 40 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Bata and similar soils: 85 percent

Minor Components

Worock and similar soils: 0 to 8 percent

Evavo and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Argillite colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

66E—Bata gravelly loam, 15 to 35 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 5,800 to 7,500 feet

Mean annual precipitation: 20 to 40 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Bata and similar soils: 85 percent

Minor Components

Worock and similar soils: 0 to 8 percent

Evaro and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Argillite colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Bignell Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Slow

Landform: Mountains

Parent material: Colluvium derived from fine grained extrusive igneous rocks

Slope range: 8 to 60 percent

Elevation range: 3,600 to 6,400 feet

Annual precipitation: 18 to 30 inches

Annual air temperature: 38 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Clayey-skeletal, mixed, superactive, frigid Typic Haplustalfs

Typical Pedon

Bignell gravelly clay loam, in an area of Bignell, dry-Yreka, cool complex, 15 to 35 percent slopes, in an area of woodland, 1,450 feet north and 350 feet east of the southwest corner of sec. 24, T. 12 N., R. 14 W.

Oi—1 inch to 0; undecomposed and slightly decomposed forest litter.

E—0 to 8 inches; light brownish gray (10YR 6/2) gravelly clay loam, dark grayish brown (10YR 4/2) moist; moderate medium granular structure; soft,

very friable, nonsticky, nonplastic; many very fine and fine and common medium roots; many very fine and fine discontinuous pores; 5 percent cobbles and 20 percent pebbles; neutral; clear smooth boundary.

E/Bt—8 to 14 inches; E part (75 percent) is light brownish gray (10YR 6/2) very gravelly loam, dark grayish brown (10YR 4/2) moist; B part (25 percent) is brown (7.5YR 4/4) very gravelly loam, dark brown (7.5YR 3/4) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine and few medium roots; many very fine and fine discontinuous pores; 5 percent cobbles and 35 percent pebbles; neutral; clear smooth boundary.

Bt1—14 to 22 inches; brown (7.5YR 4/4) very gravelly clay loam, dark brown (7.5YR 3/4) moist; moderate fine subangular blocky structure; hard, firm, moderately sticky, moderately plastic; common very fine and fine roots; common very fine discontinuous pores; common faint clay films on faces of peds; 5 percent cobbles and 40 percent pebbles; neutral; gradual wavy boundary.

Bt2—22 to 33 inches; reddish brown (5YR 4/4) very gravelly clay; dark reddish brown (5YR 3/3) moist; strong coarse subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; few very fine roots; common very fine discontinuous pores; few faint clay films on faces of peds; 5 percent cobbles and 40 percent pebbles; neutral; gradual wavy boundary.

Bt3—33 to 60 inches; pinkish gray (7.5YR 6/2) very gravelly clay; dark brown (5YR 4/2) moist; weak fine subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; few very fine roots; few very fine discontinuous pores; few faint clay films on faces of peds; 5 percent cobbles and 35 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 42 to 46 degrees F

Moisture control section: Between 4 and 12 inches

E horizon

Hue: 10YR or 7.5YR

Value: 6 or 7 dry, 4 to 6 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 10 to 30 percent

Content of rock fragments: 15 to 35 percent—0 to 5 percent cobbles; 15 to 30 percent pebbles

Reaction: pH 5.1 to 7.3

E/Bt horizon

Hue: 10YR or 7.5YR

Value: E part—6 or 7 dry, 4 to 6 moist; B part—4 to 7 dry

Chroma: E part—2 or 3; B part—2 to 6

Texture: Loam, clay loam, or sandy clay loam

Clay content: 10 to 35 percent

Content of rock fragments: 35 to 60 percent—0 to 5 percent cobbles; 35 to 55 percent pebbles

Reaction: pH 5.1 to 7.3

Bt horizons

Hue: 5YR to 10YR

Value: 4 to 7 dry; 3 to 6 moist

Chroma: 2 to 6

Texture: Clay loam, sandy clay, or clay

Clay content: 35 to 60 percent

Content of rock fragments: 35 to 60 percent—0 to 15 percent cobbles; 35 to 45 percent pebbles

Reaction: pH 5.1 to 7.3

99E—Bignell gravelly clay loam, 15 to 35 percent slopes**Setting***Landform:* Mountains*Position on landform:* Backslopes and footslopes*Slope:* 15 to 35 percent, southwest aspect*Elevation:* 3,600 to 6,400 feet*Mean annual precipitation:* 18 to 26 inches*Frost-free period:* 70 to 90 days**Composition****Major Components**

Bignell and similar soils: 85 percent

Minor Components

Crow and similar soils: 0 to 4 percent

Areas of rock outcrop: 0 to 3 percent

Whitlash and similar soils: 0 to 3 percent

Yreka and similar soils: 0 to 5 percent

Major Component Description*Surface layer texture:* Gravelly clay loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from extrusive igneous rocks*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 5.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

99F—Bignell gravelly loam, dry, 35 to 60 percent slopes**Setting***Landform:* Mountains*Position on landform:* Backslopes and shoulders*Slope:* 35 to 60 percent, southwest aspect*Elevation:* 3,600 to 6,400 feet*Mean annual precipitation:* 18 to 26 inches*Frost-free period:* 70 to 90 days**Composition****Major Components**

Bignell and similar soils: 85 percent

Minor Components

Crow and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 3 percent

Whitlash and similar soils: 0 to 3 percent

Yreka and similar soils: 0 to 4 percent

Major Component Description*Surface layer texture:* Gravelly loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from extrusive igneous rocks*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

199D—Bignell gravelly loam, 8 to 15 percent slopes**Setting***Landform:* Mountains*Position on landform:* Footslopes and toeslopes*Slope:* 8 to 15 percent, north aspect*Elevation:* 3,600 to 6,400 feet

Mean annual precipitation: 18 to 26 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Bignell and similar soils: 85 percent

Minor Components

Crow and similar soils: 0 to 5 percent
 Yreka and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

199E—Bignell gravelly loam, 15 to 35 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent, north aspect
Elevation: 3,600 to 6,400 feet
Mean annual precipitation: 18 to 26 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Bignell and similar soils: 85 percent

Minor Components

Yreka and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent
 Crow and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)

Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

199F—Bignell gravelly loam, 35 to 60 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and footslopes
Slope: 35 to 60 percent, north aspect
Elevation: 3,600 to 6,400 feet
Mean annual precipitation: 18 to 26 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Bignell and similar soils: 85 percent

Minor Components

Yreka and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent
 Crow and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

299D—Bignell, dry-Yreka, cool complex, 8 to 15 percent slopes

Setting

Landform:

- Bignell—Mountains
- Yreka—Mountains

Position on landform:

- Bignell—Foothills and toeslopes
- Yreka—Foothills and toeslopes

Slope:

- Bignell—8 to 15 percent, southwest aspect
- Yreka—8 to 15 percent, east aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 26 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Bignell and similar soils: 50 percent

Yreka and similar soils: 35 percent

Minor Components

Areas of rock outcrop: 0 to 3 percent

Crow and similar soils: 0 to 5 percent

Winkler and similar soils: 0 to 4 percent

Trapps and similar soils: 0 to 3 percent

Major Component Description

Bignell

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from
extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

Yreka

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from
igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

299E—Bignell, dry-Yreka, cool complex, 15 to 35 percent slopes

Setting

Landform:

- Bignell—Mountains
- Yreka—Mountains

Position on landform:

- Bignell—Backslopes and foothills
- Yreka—Backslopes and foothills

Slope:

- Bignell—15 to 35 percent, west aspect
- Yreka—15 to 35 percent, east aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 26 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Bignell and similar soils: 50 percent

Yreka and similar soils: 35 percent

Minor Components

Areas of rock outcrop: 0 to 3 percent

Crow and similar soils: 0 to 5 percent

Winkler and similar soils: 0 to 4 percent

Trapps and similar soils: 0 to 3 percent

Major Component Description

Bignell

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from
extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

Yreka

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from
igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

299F—Bignell-Yreka gravelly loams, 35 to 60 percent slopes

Setting

Landform:

- Bignell—Mountains
- Yreka—Mountains

Position on landform:

- Bignell—Backslopes and shoulders
- Yreka—Backslopes and shoulders

Slope:

- Bignell—35 to 60 percent, southwest aspect
- Yreka—35 to 60 percent, east aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 26 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Bignell and similar soils: 50 percent

Yreka and similar soils: 35 percent

Minor Components

Areas of rock outcrop: 0 to 4 percent

Trapps and similar soils: 0 to 4 percent

Crow and similar soils: 0 to 4 percent

Winkler and similar soils: 0 to 3 percent

Major Component Description

Bignell

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

Yreka

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

399D—Bignell-Yreka gravelly loams, 8 to 15 percent slopes

Setting

Landform:

- Bignell—Mountains
- Yreka—Mountains

Position on landform:

- Bignell—Footslopes and toeslopes
- Yreka—Footslopes and toeslopes

Slope:

- Bignell—8 to 15 percent
- Yreka—8 to 15 percent, northeast aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 26 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Bignell and similar soils: 50 percent

Yreka and similar soils: 35 percent

Minor Components

Crow and similar soils: 0 to 5 percent

Elve and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Major Component Description

Bignell

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

Yreka

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained
Dominant parent material: Material weathered from igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

399E—Bignell-Yreka complex, cool, 15 to 35 percent slopes

Setting

Landform:

- Bignell—Mountains
- Yreka—Mountains

Position on landform:

- Bignell—Backslopes and footslopes
- Yreka—Backslopes and footslopes

Slope:

- Bignell—15 to 35 percent, northeast aspect
- Yreka—15 to 35 percent, northeast aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 26 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Bignell and similar soils: 50 percent

Yreka and similar soils: 35 percent

Minor Components

Areas of rock outcrop: 0 to 4 percent

Crow and similar soils: 0 to 6 percent

Elve and similar soils: 0 to 5 percent

Major Component Description

Bignell

Surface layer texture: Gravelly clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.2 inches

Yreka

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

399F—Bignell-Yreka complex, cool, 35 to 60 percent slopes

Setting

Landform:

- Bignell—Mountains
- Yreka—Mountains

Position on landform:

- Bignell—Backslopes and shoulders
- Yreka—Backslopes and shoulders

Slope:

- Bignell—35 to 60 percent, northeast aspect
- Yreka—35 to 60 percent, northeast aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 26 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Bignell and similar soils: 50 percent

Yreka and similar soils: 35 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Crow and similar soils: 0 to 5 percent

Elve and similar soils: 0 to 5 percent

Major Component Description

Bignell

Surface layer texture: Gravelly clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.2 inches

Yreka

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

499D—Bignell-Yreka complex, 8 to 15 percent slopes

Setting

Landform:

- Bignell—Mountains
- Yreka—Mountains

Position on landform:

- Bignell—Foothills and toeslopes
- Yreka—Foothills and toeslopes

Slope:

- Bignell—8 to 15 percent
- Yreka—8 to 15 percent, east aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 26 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Bignell and similar soils: 50 percent

Yreka and similar soils: 35 percent

Minor Components

Trapps and similar soils: 0 to 3 percent

Areas of rock outcrop: 0 to 5 percent

Crow and similar soils: 0 to 7 percent

Major Component Description

Bignell

Surface layer texture: Gravelly clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.2 inches

Yreka

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

499E—Bignell-Yreka complex, 15 to 35 percent slopes

Setting

Landform:

- Bignell—Mountains
- Yreka—Mountains

Position on landform:

- Bignell—Backslopes and foothills
- Yreka—Backslopes and foothills

Slope:

- Bignell—15 to 35 percent
- Yreka—15 to 35 percent, east aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 26 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Bignell and similar soils: 50 percent

Yreka and similar soils: 35 percent

Minor Components

Trapps and similar soils: 0 to 3 percent

Areas of rock outcrop: 0 to 6 percent

Crow and similar soils: 0 to 6 percent

Major Component Description

Bignell

Surface layer texture: Gravelly clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.2 inches

Yreka

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

499F—Bignell-Yreka complex, 35 to 60 percent slopes

Setting

Landform:

- Bignell—Mountains
- Yreka—Mountains

Position on landform:

- Bignell—Backslopes and shoulders
- Yreka—Backslopes and shoulders

Slope:

- Bignell—35 to 60 percent
- Yreka—35 to 60 percent, east aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 26 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Bignell and similar soils: 50 percent
 Yreka and similar soils: 35 percent

Minor Components

Trapps and similar soils: 0 to 4 percent
 Areas of rock outcrop: 0 to 5 percent
 Crow and similar soils: 0 to 6 percent

Major Component Description

Bignell

Surface layer texture: Gravelly clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.2 inches

Yreka

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

799D—Bignell-Yreka-Crow complex, 8 to 15 percent slopes

Setting

Landform:

- Bignell—Mountains
- Yreka—Mountains
- Crow—Mountains

Position on landform:

- Bignell—Footslopes and toeslopes
- Yreka—Footslopes and toeslopes
- Crow—Footslopes and toeslopes

Slope:

- Bignell—8 to 15 percent, southwest aspect
- Yreka—8 to 15 percent, east aspect
- Crow—8 to 15 percent, southwest aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 26 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Bignell and similar soils: 55 percent

Yreka and similar soils: 15 percent

Crow and similar soils: 15 percent

Minor Components

Areas of rock outcrop: 0 to 4 percent

Whitlash and similar soils: 0 to 4 percent

Trapps and similar soils: 0 to 4 percent

Winkler and similar soils: 0 to 3 percent

Major Component Description

Bignell

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

Yreka

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

Crow

Surface layer texture: Silt loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 9.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

799E—Bignell-Yreka-Crow complex, 15 to 35 percent slopes

Setting

Landform:

- Bignell—Mountains
- Yreka—Mountains
- Crow—Mountains

Position on landform:

- Bignell—Backslopes and footslopes
- Yreka—Backslopes and footslopes
- Crow—Backslopes and footslopes

Slope:

- Bignell—15 to 35 percent, southwest aspect
- Yreka—15 to 35 percent, east aspect
- Crow—15 to 35 percent, southwest aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 26 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Bignell and similar soils: 55 percent

Yreka and similar soils: 15 percent

Crow and similar soils: 15 percent

Minor Components

Areas of rock outcrop: 0 to 4 percent

Whitlash and similar soils: 0 to 4 percent

Trapps and similar soils: 0 to 4 percent

Winkler and similar soils: 0 to 3 percent

Major Component Description

Bignell

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

Yreka

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

Crow

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 9.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Blossberg Series

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly drained

Permeability: Moderately slow to the 2C horizon, rapid below

Landform: Flood plains and low stream terraces

Parent material: Alluvium

Slope range: 0 to 4 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 10 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 105 days

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Endoaquolls

Typical Pedon

Blossberg loam, 0 to 4 percent slopes, in an area of hayland, 300 feet north and 800 feet east of the southwest corner of sec. 17, T. 7 N., R. 15 W.

Oi—1 inch to 0; partially decomposed organic matter.

A—0 to 6 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; many fine distinct strong brown (7.5YR 5/8) redox concentrations; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and few fine roots; few very fine irregular pores; neutral; clear smooth boundary.

Bg1—6 to 14 inches; dark brown (10YR 3/2) loam, brown (10YR 5/2) dry; many medium distinct strong brown (7.5YR 5/8) redox concentrations; moderate medium subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; many

very fine and few fine roots; few very fine tubular pores; neutral; clear smooth boundary.

Bg2—14 to 21 inches; dark grayish brown (10YR 4/2) loam, light brownish gray (10YR 6/2) dry; many medium distinct strong brown (7.5YR 5/8) redox concentrations; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and few fine roots; few very fine tubular pores; neutral; clear smooth boundary.

2Cg—21 to 60 inches; dark yellowish brown (10YR 4/4) very gravelly loamy sand; light yellowish brown (10YR 6/4) dry; single grain; loose, nonsticky, nonplastic; few very fine roots; 20 percent cobbles and 40 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 10 to 15 inches

Depth to the 2C horizon: 20 to 40 inches

Depth to the seasonal high water table: 12 to 24 inches

A horizon

Value: 2 or 3 moist; 3 to 5 dry

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 6.6 to 7.8

Bg1 horizon

Hue: 10YR to 5Y

Value: 3 or 4 moist; 5 or 6 dry

Chroma: 2 or 3

Texture: Loam or silty 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

Reaction: pH 6.6 to 7.8

Bg2 horizon

Hue: 10YR to 5Y

Value: 4 or 5 moist; 5 or 6 dry

Chroma: 1 or 2

Texture: Loam or sandy loam

Clay content: 10 to 20 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles

Reaction: pH 6.6 to 7.8

2Cg horizon

Value: 4 or 5 moist; 6 or 7 dry

Chroma: 2 to 4

Texture: Loamy coarse sand or sand

Clay content: 0 to 10 percent
 Content of rock fragments: 40 to 60 percent—
 20 to 25 percent cobbles; 20 to 40 percent
 pebbles
 Reaction: pH 6.6 to 7.8

634B—Blossberg loam, 0 to 4 percent slopes

Setting

Landform: Stream terraces
Position on landform: Treads
Slope: 0 to 4 percent
Elevation: 3,800 to 6,000 feet
Mean annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days

Composition

Major Components

Blossberg and similar soils: 85 percent

Minor Components

Flintcreek and similar soils: 0 to 5 percent
 Poronto and similar soils: 0 to 5 percent
 Gregson and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Apparent
Available water capacity: Mainly 4.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

834B—Blossberg loam, 0 to 4 percent slopes, rarely flooded

Setting

Landform: Flood plains
Position on landform: Treads
Slope: 0 to 4 percent
Elevation: 3,800 to 6,000 feet

Mean annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days

Composition

Major Components

Blossberg and similar soils: 85 percent

Minor Components

Dougcliff and similar soils: 0 to 3 percent
 Bandy and similar soils: 0 to 3 percent
 Mannixlee and similar soils: 0 to 3 percent
 Flintcreek and similar soils: 0 to 3 percent
 Gregson and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Apparent
Available water capacity: Mainly 4.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Boxwell Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Moderate
Landform: Sedimentary plains and hills
Parent material: Material derived from loamy shale or sandstone
Slope range: 0 to 35 percent
Elevation range: 3,600 to 5,400 feet
Annual precipitation: 10 to 14 inches
Annual air temperature: 39 to 44 degrees F
Frost-free period: 90 to 105 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Aridic Haplustolls

Typical Pedon

Boxwell loam, 8 to 15 percent slopes, in an area of rangeland, 1,700 feet north and 1,200 feet east of the southwest corner of sec. 15, T. 10 N., R. 12 W.

A—0 to 7 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine and common medium roots; common very fine tubular and many discontinuous irregular pores; 5 percent sandstone channers; neutral; clear smooth boundary.

Bw—7 to 12 inches; pale brown (10YR 6/3) clay loam, grayish brown (10YR 5/2) moist; moderate medium prismatic structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; common very fine tubular pores; slightly alkaline; clear smooth boundary.

Bk1—12 to 15 inches; pale brown (10YR 6/3) loam, grayish brown (10YR 5/2) moist; moderate medium subangular blocky structure; slightly hard, friable, moderately sticky, slightly plastic; few fine and very fine roots; common fine and very fine tubular pores; disseminated lime; common fine seams of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—15 to 25 inches; white (10YR 8/2) loam; light gray (10YR 7/2) moist; weak coarse prismatic structure; slightly hard, friable, moderately sticky, slightly plastic; few fine and very fine roots; few very fine tubular pores; few fine masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

Cr—25 to 60 inches; light gray (10YR 7/2) semiconsolidated sedimentary beds that crush to a loam.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 12 inches

Depth to the Bk horizon: 8 to 12 inches

Depth to the Cr horizon: 20 to 40 inches

A horizon

Hue: 10YR or 2.5Y

Chroma: 2 or 3

Clay content: 15 to 27 percent

Content of rock fragments: 0 to 15 percent sandstone channers

Reaction: pH 6.1 to 7.3

Bw horizon

Hue: 10YR or 2.5Y

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 4

Texture: Loam, silty clay loam, clay loam, or silt loam

Clay content: 18 to 35 percent

Content of rock fragments: 0 to 15 percent sandstone channers

Reaction: pH 6.6 to 7.8

Bk1 horizon

Hue: 10YR to 5Y

Value: 6 to 8 dry; 4 to 7 moist

Chroma: 2 or 3

Texture: Loam, clay loam, silty clay loam, or silt loam

Clay content: 15 to 27 percent

Content of rock fragments: 0 to 15 percent sandstone channers

Calcium carbonate equivalent: 15 to 30 percent

Reaction: pH 7.4 to 8.4

Bk2 horizon

Hue: 10YR to 5Y

Value: 6 to 8 dry; 4 to 7 moist

Chroma: 2 or 3

Texture: Loam or silt loam

Clay content: 15 to 27 percent

Content of rock fragments: 0 to 15 percent sandstone channers

Calcium carbonate equivalent: 15 to 30 percent

Reaction: pH 7.4 to 8.4

69C—Boxwell loam, 4 to 8 percent slopes

Setting

Landform: Sedimentary plains

Position on landform: Toeslopes

Slope: 4 to 8 percent

Elevation: 3,600 to 4,600 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Boxwell and similar soils: 85 percent

Minor Components

Tanna and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Dolus and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

69D—Boxwell loam, 8 to 15 percent slopes

Setting

Landform: Hills
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 3,600 to 4,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Composition

Major Components

Boxwell and similar soils: 85 percent

Minor Components

Tanna and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent
 Dolus and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

69E—Boxwell loam, 15 to 35 percent slopes

Setting

Landform: Hills
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent
Elevation: 3,600 to 4,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Composition

Major Components

Boxwell and similar soils: 85 percent

Minor Components

Dolus and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent
 Tanna and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Brazil Series

Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Permeability: Moderately slow
Landform: Mountains and stream terraces
Parent material: Material derived from fine grained extrusive igneous rock
Slope range: 2 to 60 percent
Elevation range: 3,600 to 6,200 feet
Annual precipitation: 15 to 19 inches
Annual air temperature: 39 to 44 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Pachic Argiustolls

Typical Pedon

Braziel gravelly loam, in an area of Braziel-Tolbert complex, 15 to 35 percent slopes, in an area of rangeland, 300 feet south and 2,300 feet west of the northeast corner of sec. 8, T. 10 N., R. 13 W.

A1—0 to 4 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; many very fine tubular pores; 5 percent cobbles and 15 percent pebbles; neutral; clear smooth boundary.

A2—4 to 8 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; many very fine and common fine tubular pores; 5 percent cobbles and 15 percent pebbles; neutral; clear smooth boundary.

Bt1—8 to 17 inches; dark grayish brown (10YR 4/2) very gravelly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine and common medium roots; many very fine discontinuous tubular pores; few faint clay films on faces of peds and lining pores; 5 percent cobbles and 30 percent pebbles; neutral; clear wavy boundary.

Bt2—17 to 23 inches; brown (10YR 5/3) very gravelly clay loam, dark yellowish brown (10YR 3/4) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine and common medium roots; many very fine and fine continuous tubular pores; common distinct clay films on faces of peds and lining pores; 5 percent cobbles and 35 percent pebbles; neutral; clear wavy boundary.

Bt3—23 to 43 inches; brown (10YR 5/3) very gravelly clay loam, dark yellowish brown (10YR 4/3) moist; weak coarse subangular blocky structure; hard, firm, slightly sticky, slightly plastic; common very fine and fine continuous tubular pores; common distinct clay films on faces of peds and lining pores; 15 percent cobbles and 40 percent pebbles; neutral; clear smooth boundary.

BC—43 to 60 inches; pale brown (10YR 6/3) extremely gravelly loam, brown (10YR 4/3) moist; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine and fine roots; few fine and very fine continuous tubular pores; 10 percent cobbles, 45 percent pebbles, 10 percent stones; neutral.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 16 to 27 inches

A horizons

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 2 or 3 dry; 1 to 3 moist

Clay content: 18 to 27 percent

Content of rock fragments: 5 to 50 percent—0 to 15 percent stones; 0 to 10 percent cobbles; 5 to 25 percent pebbles

Reaction: pH 6.6 to 7.3

Bt horizons

Value: 4 to 6 dry; 3 or 4 moist

Chroma: 2 to 4

Texture: Clay loam, sandy clay loam, or loam

Clay content: 25 to 35 percent

Content of rock fragments: 35 to 75 percent—0 to 10 percent stones; 5 to 20 percent cobbles; 30 to 45 percent pebbles

Reaction: pH 6.6 to 7.3

BC horizon

Value: 5 to 7 dry; 3 to 6 moist

Chroma: 3 or 4 dry; 2 to 4 moist

Texture: Loam, sandy loam, or sandy clay loam

Clay content: 15 to 30 percent

Content of rock fragments: 35 to 70 percent—0 to 15 percent stones; 5 to 15 percent cobbles; 30 to 45 percent pebbles

Reaction: pH 6.6 to 7.8

200E—Braziel-Tolbert-Rock outcrop complex, 15 to 35 percent slopes

Setting

Landform:

- Braziel—Mountains
- Tolbert—Mountains
- Rock outcrop—Mountains

Position on landform:

- Braziel—Backslopes and footslopes
- Tolbert—Backslopes and footslopes
- Rock outcrop—Backslopes and footslopes

Slope:

- Braziel—15 to 35 percent
- Tolbert—15 to 35 percent

Elevation: 3,800 to 6,200 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days**Composition****Major Components**

Braziel and similar soils: 40 percent
 Tolbert and similar soils: 30 percent
 Rock outcrop: 15 percent

Minor Components

Perma and similar soils: 0 to 8 percent
 Shanley and similar soils: 0 to 7 percent

Major Component Description**Braziel***Surface layer texture:* Gravelly loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from extrusive igneous rocks*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 5.2 inches**Tolbert***Surface layer texture:* Gravelly loam*Depth class:* Shallow (10 to 20 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from igneous rocks*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 1.2 inches**Rock outcrop***Definition:* Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

200F—Braziel-Tolbert-Rock outcrop complex, 35 to 60 percent slopes**Setting***Landform:*

- Braziel—Mountains
- Tolbert—Mountains
- Rock outcrop—Mountains

Position on landform:

- Braziel—Backslopes and shoulders
- Tolbert—Backslopes and shoulders
- Rock outcrop—Backslopes and shoulders

Slope:

- Braziel—35 to 60 percent
- Tolbert—35 to 60 percent

Elevation: 3,800 to 6,200 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days**Composition****Major Components**

Braziel and similar soils: 40 percent
 Tolbert and similar soils: 30 percent
 Rock outcrop: 15 percent

Minor Components

Perma and similar soils: 0 to 8 percent
 Shanley and similar soils: 0 to 7 percent

Major Component Description**Braziel***Surface layer texture:* Gravelly loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from extrusive igneous rocks*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 5.2 inches**Tolbert***Surface layer texture:* Gravelly loam*Depth class:* Shallow (10 to 20 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from extrusive igneous rocks*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 1.2 inches**Rock outcrop***Definition:* Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

242B—Braziel gravelly loam, 2 to 4 percent slopes

Setting

Landform: Mountains
Position on landform: Toeslopes
Slope: 2 to 4 percent
Elevation: 3,800 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Braziel and similar soils: 85 percent

Minor Components

Shanley and similar soils: 0 to 5 percent

Perma and similar soils: 0 to 5 percent

Straw and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

242C—Braziel gravelly loam, 4 to 8 percent slopes

Setting

Landform: Mountains
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 3,800 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Braziel and similar soils: 85 percent

Minor Components

Shanley and similar soils: 0 to 5 percent

Perma and similar soils: 0 to 5 percent

Straw and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

242D—Braziel gravelly loam, 8 to 15 percent slopes

Setting

Landform: Mountains
Position on landform: Footslopes and toeslopes

Slope: 8 to 15 percent
Elevation: 3,800 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Braziel and similar soils: 85 percent

Minor Components

Perma and similar soils: 0 to 5 percent
 Shanley and similar soils: 0 to 5 percent
 Straw and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

242E—Braziel gravelly loam, 15 to 35 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent
Elevation: 3,800 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Braziel and similar soils: 85 percent

Minor Components

Shanley and similar soils: 0 to 5 percent
 Perma and similar soils: 0 to 5 percent
 Straw and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)

Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

242F—Braziel gravelly loam, 35 to 60 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent
Elevation: 3,800 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Braziel and similar soils: 85 percent

Minor Components

Perma and similar soils: 0 to 7 percent
 Shanley and similar soils: 0 to 5 percent
 Straw and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

342C—Braziel stony loam, 4 to 8 percent slopes**Setting**

Landform: Mountains
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 3,800 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Braziel and similar soils: 85 percent

Minor Components

Perma and similar soils: 0 to 5 percent
 Shanley and similar soils: 0 to 5 percent
 Shawmut and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Stony loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

342D—Braziel stony loam, 8 to 15 percent slopes**Setting**

Landform: Mountains
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 3,800 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Braziel and similar soils: 85 percent

Minor Components

Perma and similar soils: 0 to 5 percent
 Shanley and similar soils: 0 to 5 percent
 Shawmut and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Stony loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

342E—Braziel stony loam, 15 to 35 percent slopes**Setting**

Landform: Mountains
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent
Elevation: 3,800 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Braziel and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
 Shawmut and similar soils: 0 to 3 percent
 Shanley and similar soils: 0 to 4 percent
 Perma and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Stony loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

442C—Braziel-Tolbert gravelly loams, 4 to 8 percent slopes

Setting

Landform:

- Braziel—Mountains
- Tolbert—Mountains

Position on landform:

- Braziel—Toeslopes
- Tolbert—Toeslopes

Slope:

- Braziel—4 to 8 percent
- Tolbert—4 to 8 percent

Elevation: 3,800 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Braziel and similar soils: 50 percent

Tolbert and similar soils: 35 percent

Minor Components

Shanley and similar soils: 0 to 5 percent

Perma and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Major Component Description

Braziel

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.2 inches

Tolbert

Surface layer texture: Gravelly loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

442D—Braziel-Tolbert gravelly loams, 8 to 15 percent slopes

Setting

Landform:

- Braziel—Mountains
- Tolbert—Mountains

Position on landform:

- Braziel—Backslopes and footslopes
- Tolbert—Footslopes and toeslopes

Slope:

- Braziel—8 to 15 percent
- Tolbert—8 to 15 percent

Elevation: 3,800 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Braziel and similar soils: 50 percent

Tolbert and similar soils: 35 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Shanley and similar soils: 0 to 5 percent

Perma and similar soils: 0 to 5 percent

Major Component Description

Braziel

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.2 inches

Tolbert

Surface layer texture: Gravelly loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

442E—Braziel-Tolbert complex, 15 to 35 percent slopes

Setting

Landform:

- Braziel—Mountains
- Tolbert—Mountains

Position on landform:

- Braziel—Backslopes and footslopes
- Tolbert—Backslopes and footslopes

Slope:

- Braziel—15 to 35 percent
- Tolbert—15 to 35 percent

Elevation: 3,800 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Braziel and similar soils: 50 percent

Tolbert and similar soils: 35 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Perma and similar soils: 0 to 5 percent

Shanley and similar soils: 0 to 5 percent

Major Component Description

Braziel

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.2 inches

Tolbert

Surface layer texture: Gravelly loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

442F—Braziel-Tolbert gravelly loams, 35 to 60 percent slopes

Setting

Landform:

- Braziel—Mountains
- Tolbert—Mountains

Position on landform:

- Braziel—Backslopes and shoulders
- Tolbert—Backslopes and shoulders

Slope:

- Braziel—35 to 60 percent
- Tolbert—35 to 60 percent

Elevation: 3,800 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Braziel and similar soils: 50 percent

Tolbert and similar soils: 35 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Perma and similar soils: 0 to 5 percent

Shanley and similar soils: 0 to 5 percent

Major Component Description

Braziel

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.2 inches

Tolbert

Surface layer texture: Gravelly loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

542C—Braziel-Shanley gravelly loams, 4 to 8 percent slopes

Setting

Landform:

- Braziel—Mountains
- Shanley—Mountains

Position on landform:

- Braziel—Foothills and toeslopes
- Shanley—Foothills and toeslopes

Slope:

- Braziel—4 to 8 percent
- Shanley—4 to 8 percent

Elevation: 3,800 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Braziel and similar soils: 50 percent

Shanley and similar soils: 35 percent

Minor Components

Perma and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Straw and similar soils: 0 to 5 percent

Major Component Description

Braziel

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.2 inches

Shanley

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium or colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

542D—Braziel-Shanley gravelly loams, 8 to 15 percent slopes

Setting

Landform:

- Braziel—Mountains
- Shanley—Mountains

Position on landform:

- Braziel—Foothills and toeslopes
- Shanley—Foothills and toeslopes

Slope:

- Braziel—8 to 15 percent
- Shanley—8 to 15 percent

Elevation: 3,800 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Braziel and similar soils: 50 percent

Shanley and similar soils: 35 percent

Minor Components

Perma and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Straw and similar soils: 0 to 5 percent

Major Component Description

Braziel

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.2 inches

Shanley

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

542E—Braziel-Shanley gravelly loams, 15 to 35 percent slopes

Setting

Landform:

- Braziel—Mountains
- Shanley—Mountains

Position on landform:

- Braziel—Backslopes and footslopes
- Shanley—Backslopes and footslopes

Slope:

- Braziel—15 to 35 percent
- Shanley—15 to 35 percent

Elevation: 3,800 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Braziel and similar soils: 50 percent
 Shanley and similar soils: 35 percent

Minor Components

Perma and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent
 Straw and similar soils: 0 to 5 percent

Major Component Description

Braziel

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.2 inches

Shanley

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

542F—Braziel-Shanley gravelly loams, 35 to 60 percent slopes

Setting

Landform:

- Braziel—Mountains
- Shanley—Mountains

Position on landform:

- Braziel—Backslopes and shoulders
- Shanley—Backslopes and shoulders

Slope:

- Braziel—35 to 60 percent
- Shanley—35 to 60 percent

Elevation: 3,800 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Braziel and similar soils: 50 percent
 Shanley and similar soils: 35 percent

Minor Components

Perma and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent
 Straw and similar soils: 0 to 5 percent

Major Component Description**Brazil**

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.2 inches

Shanley

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Canarway Series

Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Permeability: Very rapid
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Elevation range: 3,600 to 5,800 feet
Annual precipitation: 10 to 19 inches
Annual air temperature: 39 to 44 degrees F
Frost-free period: 70 to 105 days

Taxonomic Class: Sandy-skeletal, mixed, frigid Aeric Fluvaquents

Typical Pedon

Canarway gravelly sandy loam, in an area of McCabe-Canarway complex, 0 to 2 percent slopes, occasionally flooded, in an area of pasture, 1,100 feet

north and 1,900 feet east of the southwest corner of sec. 14, T. 10 N., R. 12 W.

- A—0 to 4 inches; very dark gray (10YR 3/1) gravelly sandy loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and very fine and common medium roots; common fine and very fine tubular pores; 20 percent pebbles; strongly effervescent; moderately alkaline; clear smooth boundary.
- C1—4 to 8 inches; dark grayish brown (10YR 4/2) gravelly coarse sandy loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; common medium and fine roots; common very fine tubular pores; 20 percent pebbles; slightly effervescent; slightly alkaline; clear smooth boundary.
- C2—8 to 10 inches; dark grayish brown (10YR 4/2) gravelly sandy loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; few medium, common fine, and very fine roots; common very fine tubular pores; 20 percent pebbles; slightly effervescent; slightly alkaline; clear smooth boundary.
- 2C3—10 to 60 inches; dark grayish brown (10YR 4/2) very gravelly sand, grayish brown (10YR 5/2) dry; many fine faint yellowish brown (10YR 5/6) redox concentrations; single grain; loose, nonsticky, nonplastic; few fine roots; 35 percent pebbles and 20 percent cobbles; slightly alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F
Moisture control section: Between 12 and 35 inches
Depth to the seasonal high water table: 12 to 24 inches

A horizon
 Value: 2 or 3 moist; 3 to 5 dry
 Chroma: 1 to 3
 Clay content: 5 to 15 percent
 Content of rock fragments: 15 to 25 percent—0 to 5 percent cobbles; 15 to 20 percent pebbles
 Reaction: pH 6.6 to 8.4

C1 horizon

Value: 4 or 5 moist; 5 or 6 dry
 Chroma: 2 or 3
 Texture: Loamy sand or coarse sandy loam
 Clay content: 5 to 15 percent
 Content of rock fragments: 0 to 25 percent—0 to 5 percent cobbles; 0 to 20 percent pebbles
 Reaction: pH 7.4 to 7.8

C2 horizon

Value: 4 or 5 moist; 5 or 6 dry
 Chroma: 2 or 3
 Texture: Sandy loam or sand
 Clay content: 5 to 15 percent
 Content of rock fragments: 0 to 25 percent—0 to 5 percent cobbles; 0 to 20 percent pebbles
 Reaction: pH 7.4 to 7.8

2C3 horizon

Value: 4 or 5 moist; 5 or 6 dry
 Chroma: 2 or 3
 Texture: Loamy sand or sand
 Clay content: 0 to 10 percent
 Content of rock fragments: 35 to 60 percent—10 to 25 percent cobbles; 25 to 35 percent pebbles
 Reaction: pH 6.6 to 7.8

111A—Canarway-Mccabe complex, 0 to 2 percent slopes, occasionally flooded

Setting

Landform:

- Canarway—Flood plains
- Mccabe—Flood plains

Position on landform:

- Canarway—Treads
- Mccabe—Treads

Slope:

- Canarway—0 to 2 percent
- Mccabe—0 to 2 percent

Elevation: 3,600 to 5,800 feet

Mean annual precipitation: 10 to 19 inches

Frost-free period: 70 to 105 days

Composition

Major Components

Canarway and similar soils: 45 percent
 Mccabe and similar soils: 40 percent

Minor Components

Flintcreek and similar soils: 0 to 5 percent
 Areas of riverwash: 0 to 5 percent
 Water: 0 to 3 percent
 Nythar and similar soils: 0 to 2 percent

Major Component Description

Canarway

Surface layer texture: Gravelly sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Occasional

Water table: Apparent

Available water capacity: Mainly 2.8 inches

Mccabe

Surface layer texture: Sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Occasional

Water table: Apparent

Available water capacity: Mainly 6.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Carett Series

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Moderately slow

Landform: Stream terraces and alluvial fans

Parent material: Alluvium or colluvium derived from semiconsolidated tuff

Slope range: 15 to 35 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Ashy, glassy, frigid Vitrandic Argiustolls

Typical Pedon

Carett very cobbly silty clay loam, in an area of Roy-Carett-Elflint complex, 15 to 35 percent slopes, in an area of rangeland, 2,550 feet south and 1,600 feet east of the northwest corner of sec. 25, T. 5 N., R. 15 W.

A—0 to 9 inches; very dark gray (10YR 3/1) very cobbly silty clay loam, black (10YR 2/1) moist; moderate fine granular structure; slightly hard, very friable, moderately sticky, moderately plastic; many very fine and fine roots; few very fine tubular pores; 30 percent cobbles and 20 percent pebbles; neutral; clear smooth boundary.

- Bt1—9 to 15 inches; brown (10YR 4/3) cobbly silty clay loam, dark brown (10YR 3/3) moist; strong medium subangular blocky structure; very hard, very friable, moderately sticky, moderately plastic; many very fine and fine roots; few medium tubular pores; common distinct clay films on faces of peds; 15 percent cobbles and 10 percent pebbles; neutral; gradual smooth boundary.
- Bt2—15 to 24 inches; brown (10YR 5/3) cobbly silty clay loam, brown (10YR 5/3) moist; moderate fine subangular blocky structure; hard, very friable, moderately sticky, moderately plastic; many very fine and common fine roots; few medium tubular pores; common distinct clay films on faces of peds and lining pores; 15 percent cobbles and 10 percent pebbles; slightly alkaline; clear wavy boundary.
- Cr—24 to 60 inches; very pale brown (10YR 7/3) semiconsolidated tuff that crushes to silt loam.

Range in Characteristics

Soil temperature: 41 to 46 degrees F
Moisture control section: Between 4 and 12 inches
Thickness of the mollic epipedon: 8 to 15 inches
Depth to the argillic horizon: 8 to 12 inches
Depth to the Cr horizon: 20 to 40 inches

A horizon

Value: 3 or 4 dry; 2 or 3 moist
 Chroma: 1 or 2
 Clay content: 27 to 35 percent
 Content of rock fragments: 35 to 60 percent—
 25 to 35 percent cobbles; 10 to 25 percent
 pebbles
 Reaction: 6.6 to 7.3

Bt1 horizon

Value: 4 or 5 dry; 3 or 4 moist
 Chroma: 2 or 3
 Texture: Silty clay loam, clay, or silty clay
 Clay content: 35 to 50 percent
 Content of rock fragments: 15 to 35 percent—
 10 to 20 percent cobbles; 5 to 15 percent
 pebbles
 Reaction: 6.6 to 7.3

Bt2 horizon

Value: 5 or 6 dry; 4 or 5 moist
 Chroma: 3 or 4
 Texture: Silty clay loam, clay, or silty clay
 Clay content: 35 to 50 percent
 Content of rock fragments: 15 to 35 percent—
 10 to 20 percent cobbles; 5 to 15 percent
 pebbles
 Reaction: 6.6 to 7.8

Cetrack Series

Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Permeability: Moderate to the 2C horizon, rapid below
Landform: Alluvial fans and stream terraces
Parent material: Calcareous alluvium
Slope range: 0 to 15 percent
Elevation range: 3,600 to 4,600 feet
Annual precipitation: 10 to 14 inches
Annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 105 days

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Aridic Haplustolls

Typical Pedon

Cetrack loam, 0 to 4 percent slopes, in an area of irrigated cropland, 2,310 feet south and 2,310 feet east of the northwest corner of sec. 6, T. 10 N., R. 12 W.

Ap—0 to 6 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine roots; few medium tubular pores; neutral; abrupt smooth boundary.

Bw—6 to 12 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine roots; common very fine tubular pores; 5 percent pebbles; slightly alkaline; gradual smooth boundary.

Bk1—12 to 16 inches; pale brown (10YR 6/3) loam, dark brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; common very fine roots; common very fine tubular pores; 5 percent pebbles; few medium threads and masses of lime; strongly effervescent; moderately alkaline; gradual smooth boundary.

Bk2—16 to 32 inches; light gray (10YR 7/2) loam; brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; common very fine roots; common very fine irregular pores; 10 percent pebbles; many fine masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

2C—32 to 60 inches; light gray (10YR 7/2) very gravelly loamy sand; grayish brown (10YR 5/2) moist; single grain; loose, nonsticky, nonplastic;

few very fine roots; 40 percent pebbles and 20 percent cobbles; common distinct lime casts on underside of coarse fragments; strongly effervescent in upper part; slightly alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 14 inches

Depth to the Bk horizon: 8 to 14 inches

Depth to the 2C horizon: 20 to 40 inches

Ap horizon

Chroma: 2 or 3

Clay content: 15 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

Bw horizon

Hue: 7.5YR to 2.5Y

Value: 5 or 6 dry; 3 or 4 moist

Chroma: 2 or 3

Texture: Loam or clay loam

Clay content: 22 to 32 percent

Content of rock fragments: 0 to 20 percent—0 to 5 percent cobbles; 0 to 15 percent pebbles

Reaction: pH 6.6 to 7.8

Bk1 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

Content of rock fragments: 5 to 20 percent—0 to 5 percent cobbles; 5 to 15 percent pebbles

Calcium carbonate equivalent: 15 to 20 percent

Reaction: pH 7.4 to 8.4

Bk2 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

Content of rock fragments: 5 to 25 percent—0 to 5 percent cobbles; 5 to 20 percent pebbles

Calcium carbonate equivalent: 15 to 30 percent

Reaction: pH 7.9 to 8.4

2C horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Loamy sand or sand

Clay content: 0 to 10 percent

Content of rock fragments: 35 to 70 percent—0 to 20 percent cobbles; 35 to 50 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4

34B—Cetrack loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Toeslopes

Slope: 0 to 4 percent

Elevation: 3,600 to 4,600 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Cetrack and similar soils: 85 percent

Minor Components

Gregson and similar soils: 0 to 4 percent

Windlass and similar soils: 0 to 4 percent

Rothiemay and similar soils: 0 to 4 percent

Sixbeacon and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

34C—Cetrack loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Toeslopes

Slope: 4 to 8 percent

Elevation: 3,600 to 4,600 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Cetrack and similar soils: 85 percent

Minor Components

Gregson and similar soils: 0 to 4 percent
 Rothiemay and similar soils: 0 to 4 percent
 Windlass and similar soils: 0 to 4 percent
 Sixbeacon and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

34D—Cetrack loam, 8 to 15 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Foothills and toeslopes
Slope: 8 to 15 percent
Elevation: 3,600 to 4,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Composition**Major Components**

Cetrack and similar soils: 85 percent

Minor Components

Gregson and similar soils: 0 to 4 percent
 Windlass and similar soils: 0 to 4 percent
 Rothiemay and similar soils: 0 to 4 percent
 Sixbeacon and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Clasoil Series

Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Permeability: Moderate
Landform: Mountains, alluvial fans, and stream terraces
Parent material: Alluvium derived from granite and other coarse grained igneous rocks
Slope range: 4 to 35 percent
Elevation range: 3,600 to 5,400 feet
Annual precipitation: 15 to 19 inches
Annual air temperature: 39 to 44 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Typic Argiustolls

Typical Pedon

Clasoil sandy loam, 4 to 8 percent slopes, in an area of rangeland, 400 feet south and 1,500 feet east of the northwest corner of sec. 27, T. 10 N., R. 12 W.

A—0 to 7 inches; dark grayish brown (10YR 4/2) sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine discontinuous and few very fine tubular pores; 5 percent pebbles; neutral; clear smooth boundary.

Bt1—7 to 9 inches; brown (10YR 5/3) sandy clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; common very fine and fine tubular and many very fine discontinuous pores; few faint clay films on faces of peds; 5 percent pebbles; neutral; gradual smooth boundary.

Bt2—9 to 15 inches; yellowish brown (10YR 5/4) sandy clay loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; common very fine and fine tubular and many very fine

discontinuous pores; few faint clay films on faces of peds; 10 percent pebbles; neutral; clear smooth boundary.

BC1—15 to 24 inches; light yellowish brown (2.5Y 6/4) gravelly coarse sandy loam, light olive brown (2.5Y 5/4) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; many very fine roots; many fine tubular pores; 30 percent pebbles; slightly effervescent; slightly alkaline; gradual wavy boundary.

BC2—24 to 60 inches; light yellowish brown (2.5Y 6/4) very gravelly coarse sandy loam; light olive brown (2.5Y 5/4) moist; single grain; loose, nonsticky, nonplastic; few very fine roots; common very fine discontinuous irregular pores; 35 percent pebbles; strongly effervescent; slightly alkaline.

Range in Characteristics

Soil temperature: 38 to 43 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 10 inches

A horizon

Hue: 10YR or 2.5Y

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 15 to 20 percent

Content of rock fragments: 0 to 15 percent—0 to 5 cobbles; 0 to 10 percent pebbles

Reaction: 5.6 to 7.3

Bt horizons

Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 to 4

Texture: Loam or sandy clay loam

Clay content: 18 to 30 percent

Content of rock fragments: 5 to 35 percent—0 to 5 percent cobbles; 5 to 30 percent pebbles

Reaction: 5.6 to 7.3

BC horizons

Hue: 2.5Y or 10YR

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 3 to 6

Texture: Loam, sandy loam, or coarse sandy loam

Clay content: 12 to 20 percent

Content of rock fragments: 20 to 45 percent—0 to 10 percent cobbles; 20 to 35 percent pebbles

Reaction: 7.4 to 7.8

152C—Clasoil sandy loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Toeslopes

Slope: 4 to 8 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Clasoil and similar soils: 85 percent

Minor Components

Crackerville and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Martinsdale and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from intrusive igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

152D—Clasoil sandy loam, 8 to 15 percent slopes

Setting

Landform: Stream terraces

Position on landform: Footslopes and toeslopes

Slope: 8 to 15 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Clasoil and similar soils: 85 percent

Minor Components

Crackerville and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Martinsdale and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from intrusive igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

152E—Clasoil sandy loam, 15 to 35 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Clasoil and similar soils: 85 percent

Minor Components

Crackerville and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Martinsdale and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from intrusive igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

552D—Clasoil-Crackerville complex, 8 to 15 percent slopes

Setting

Landform:

- Clasoil—Mountains
- Crackerville—Mountains

Position on landform:

- Clasoil—Footslopes and toeslopes
- Crackerville—Footslopes and toeslopes

Slope:

- Clasoil—8 to 15 percent
- Crackerville—4 to 8 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Clasoil and similar soils: 50 percent

Crackerville and similar soils: 35 percent

Minor Components

Martinsdale and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Soils with stony surfaces: 0 to 5 percent

Major Component Description

Clasoil

Surface layer texture: Sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from intrusive igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.4 inches

Crackerville

Surface layer texture: Bouldery sandy loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from intrusive igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

552E—Clasoil-Crackerville complex, 15 to 35 percent slopes

Setting

Landform:

- Clasoil—Alluvial fans and stream terraces
- Crackerville—Mountains

Position on landform:

- Clasoil—Backslopes and footslopes
- Crackerville—Backslopes and footslopes

Slope:

- Clasoil—15 to 35 percent
- Crackerville—15 to 35 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Clasoil and similar soils: 50 percent

Crackerville and similar soils: 35 percent

Minor Components

Martinsdale and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Soils with stony surfaces: 0 to 5 percent

Major Component Description

Clasoil

Surface layer texture: Sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from intrusive igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.4 inches

Crackerville

Surface layer texture: Bouldery sandy loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from intrusive igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

752D—Clasoil-Crackerville-Rock outcrop complex, 8 to 15 percent slopes

Setting

Landform:

- Clasoil—Mountains
- Crackerville—Mountains
- Rock outcrop—Mountains

Position on landform:

- Clasoil—Footslopes and toeslopes
- Crackerville—Footslopes and toeslopes
- Rock outcrop—Footslopes and toeslopes

Slope:

- Clasoil—8 to 15 percent
- Crackerville—8 to 15 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Clasoil and similar soils: 40 percent

Crackerville and similar soils: 30 percent

Rock outcrop: 15 percent

Minor Components

Martinsdale and similar soils: 0 to 5 percent

Soils shallow to bedrock: 0 to 5 percent

Clasoil, greater slope: 0 to 5 percent

Major Component Description

Clasoil

Surface layer texture: Sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained
Dominant parent material: Material weathered from
 intrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.4 inches

Crackerville

Surface layer texture: Bouldery sandy loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 intrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.5 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

752E—Clasoil-Crackerville-Rock outcrop complex, 15 to 35 percent slopes

Setting

Landform:

- Clasoil—Mountains
- Crackerville—Mountains
- Rock outcrop—Mountains

Position on landform:

- Clasoil—Backslopes and footslopes
- Crackerville—Backslopes and footslopes
- Rock outcrop—Backslopes and footslopes

Slope:

- Clasoil—15 to 35 percent
- Crackerville—15 to 35 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Clasoil and similar soils: 40 percent
 Crackerville and similar soils: 30 percent
 Rock outcrop: 15 percent

Minor Components

Martinsdale and similar soils: 0 to 5 percent
 Soils shallow to bedrock: 0 to 5 percent
 Clasoil, greater slope: 0 to 5 percent

Major Component Description

Clasoil

Surface layer texture: Sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 intrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.4 inches

Crackerville

Surface layer texture: Bouldery sandy loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 intrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.5 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Coben Series

Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Permeability: Slow
Landform: Alluvial fans and stream terraces
Parent material: Alluvium
Slope range: 0 to 15 percent
Elevation range: 3,600 to 5,800 feet
Annual precipitation: 15 to 19 inches
Annual air temperature: 39 to 44 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Fine, smectitic, frigid Vertic
 Argiustolls

Typical Pedon

Coben clay loam, 0 to 4 percent slopes, in an area of rangeland, 25 feet south and 2,600 feet east of the northwest corner of sec. 32, T. 10 N., R. 12 W.

- A—0 to 5 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak medium platy structure parting to weak fine granular; slightly hard, friable, moderately sticky, moderately plastic; many very fine roots; many very fine and fine irregular pores; 5 percent pebbles; neutral; abrupt wavy boundary.
- Bt—5 to 12 inches; grayish brown (10YR 5/2) clay, very dark grayish brown (10YR 3/2) moist; strong medium columnar structure parting to strong medium blocky; very hard, very firm, very sticky, very plastic; common very fine roots between faces of peds; few fine tubular pores; many distinct clay films on faces of peds; neutral; gradual smooth boundary.
- Bk1—12 to 24 inches; pale brown (10YR 6/3) clay, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; hard, firm, very sticky, very plastic; common very fine roots between faces of peds; few fine tubular pores; few fine masses of lime; strongly effervescent; slightly alkaline; gradual smooth boundary.
- Bk2—24 to 40 inches; pale brown (10YR 6/3) clay, yellowish brown (10YR 5/4) moist; weak coarse subangular blocky structure; hard, firm, very sticky, very plastic; few very fine roots; few fine tubular pores; few fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.
- By—40 to 46 inches; pale brown (10YR 6/3) clay, yellowish brown (10YR 5/4) moist; weak fine subangular blocky structure; hard, firm, very sticky, very plastic; few very fine roots; many very fine pores; many very fine gypsum nodules; strongly effervescent; moderately alkaline; gradual wavy boundary.
- BC—46 to 60 inches; brown (10YR 5/3) clay loam; dark yellowish brown (10YR 4/4) moist; massive; hard, friable, moderately sticky, very plastic; 10 percent pebbles; slightly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 38 to 43 degrees F
Moisture control section: Between 4 and 12 inches
Thickness of the mollic epipedon: 7 to 15 inches
Depth to the Bk horizon: 12 to 30 inches
Depth to the By horizon: 40 to 60 inches

A horizon

Hue: 10YR or 2.5Y
 Value: 4 or 5 dry; 2 or 3 moist
 Chroma: 2 or 3
 Clay content: 27 to 35 percent
 Content of rock fragments: 0 to 15 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 to 4
 Texture: Clay loam, clay, or silty clay
 Clay content: 35 to 60 percent
 Content of rock fragments: 0 to 10 percent pebbles
 Sodium adsorption ratio: 0 to 8 percent
 Reaction: pH 6.6 to 7.3

Bk1 horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry; 4 or 5 moist
 Chroma: 3 or 4
 Texture: Clay loam, clay, or silty clay loam
 Clay content: 35 to 50 percent
 Content of rock fragments: 0 to 10 percent pebbles
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: pH 7.4 to 8.4

Bk2 horizon

Value: 6 or 7 dry; 4 or 5 moist
 Chroma: 3 or 4
 Texture: Clay or clay loam
 Clay content: 35 to 45 percent
 Content of rock fragments: 0 to 10 percent pebbles
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: pH 7.4 to 8.4

By horizon

Value: 6 or 7 dry; 4 or 5 moist
 Chroma: 3 or 4
 Texture: Clay loam or clay
 Clay content: 30 to 45 percent
 Content of rock fragments: 0 to 10 percent pebbles
 Gypsum: 0 to 2 percent
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: pH 7.4 to 8.4

BC horizon

Value: 5 to 7 dry; 4 or 5 moist
 Chroma: 3 or 4
 Texture: Clay loam or loam

Clay content: 20 to 35 percent
 Content of rock fragments: 10 to 20 percent
 pebbles
 Reaction: pH 7.4 to 8.4

58B—Coben clay loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 0 to 4 percent
Elevation: 4,400 to 5,800 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Coben and similar soils: 85 percent

Minor Components

Ekah and similar soils: 0 to 5 percent
 Danvers and similar soils: 0 to 5 percent
 Martinsdale and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

58C—Coben clay loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 4,400 to 5,800 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Coben and similar soils: 85 percent

Minor Components

Danvers and similar soils: 0 to 5 percent
 Ekah and similar soils: 0 to 5 percent
 Martinsdale and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

58D—Coben clay loam, 8 to 15 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 4,400 to 5,800 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Coben and similar soils: 85 percent

Minor Components

Danvers and similar soils: 0 to 5 percent
 Ekah and similar soils: 0 to 5 percent
 Martinsdale and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Comad Series

Depth class: Very deep (more than 60 inches)

Drainage class: Excessively drained

Permeability: Rapid

Landform: Mountains

Parent material: Material weathered from intrusive igneous rocks

Slope range: 8 to 60 percent

Elevation range: 5,800 to 7,500 feet

Annual precipitation: 20 to 30 inches

Annual air temperature: 35 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Sandy-skeletal, mixed Lamellic Cryorthents

Typical Pedon

Comad very stony sandy loam, in an area of Comad-Elkner complex, 15 to 35 percent slopes, in an area of woodland, 1,400 feet north and 700 feet east of the southwest corner of sec. 29, T. 8 N., R. 15 W.

Oe—1 inch to 0; decomposed forest litter.

E—0 to 15 inches; light gray (10YR 7/2) very stony sandy loam, grayish brown (10YR 5/2) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine and fine and common coarse roots; common very fine interstitial pores; 25 percent stones, 20 percent cobbles, and 10 percent pebbles; neutral; clear smooth boundary.

E and Bt1—15 to 25 inches; E part (80 percent) is light brownish gray (10YR 6/2) very stony coarse sand, grayish brown (10YR 5/2) moist; B part (20 percent) is strong brown (7.5YR 5/6) sandy loam lamellae 1/4- to 1/2-inch thick, dark yellowish brown (7.5YR 4/6) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; few very fine interstitial pores; 20 percent stones, 15 percent cobbles, and 10 percent pebbles; neutral; clear smooth boundary.

E and Bt2—25 to 35 inches; E part (80 percent) is light brownish gray (10YR 6/2) very stony coarse sand, grayish brown (10YR 5/2) moist; B part (20 percent) is strong brown (7.5YR 5/6) sandy loam lamellae 1/4- to 1/2-inch thick, dark yellowish brown (7.5YR 4/6) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; few very fine interstitial pores; 20 percent stones, 15 percent cobbles, and 10 percent pebbles; neutral; clear smooth boundary.

BC—35 to 60 inches; light gray (10YR 7/2) very stony coarse sand, grayish brown (10YR 5/2) moist; single grain; loose, nonsticky, nonplastic; few very fine roots; 25 percent stones, 10 percent cobbles, and 5 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 36 to 43 degrees F

Moisture control section: Between 12 and 35 inches

Depth to the lamellae: 13 to 20 inches

E horizon

Hue: 10YR or 7.5YR

Value: 6 or 7 dry; 3 to 5 moist

Chroma: 2 or 3

Clay content: 5 to 15 percent

Content of rock fragments: 40 to 70 percent—
10 to 35 percent stones; 20 to 25 percent cobbles; 10 to 15 percent pebbles

Reaction: pH 5.1 to 7.3

E and Bt horizons

Hue: 7.5YR or 10YR

Value: E part—6 or 7 dry, 4 to 6 moist; B part—
5 or 6 dry, 4 or 5 moist

Chroma: E part—2 or 3; B part—3, 4, or 6

Clay content: 0 to 15 percent

Content of rock fragments: 40 to 80 percent—
15 to 35 percent stones; 15 to 25 percent cobbles; 10 to 20 percent pebbles

Reaction: pH 5.1 to 7.3

BC horizon

Hue: 7.5YR or 10YR

Value: 6 or 7 dry, 5 or 6 moist

Chroma: 2 or 3

Texture: Loamy sand, sand, or coarse sand

Clay content: 0 to 10 percent

Content of rock fragments: 40 to 80 percent—
25 to 35 percent stones; 10 to 25 percent cobbles; 5 to 20 percent pebbles

Reaction: pH 5.6 to 7.3

280E—Comad-Elkner-Rock outcrop complex, 15 to 35 percent slopes

Setting

Landform:

- Comad—Mountains
- Elkner—Mountains
- Rock outcrop—Mountains

Position on landform:

- Comad—Backslopes and footslopes
- Elkner—Backslopes and footslopes
- Rock outcrop—Backslopes and footslopes

Slope:

- Comad—15 to 35 percent
- Elkner—15 to 35 percent

Elevation: 5,800 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Comad and similar soils: 40 percent

Elkner and similar soils: 25 percent

Rock outcrop: 20 percent

Minor Components

Soils less than 40 inches deep: 0 to 8 percent

Rubble land: 0 to 7 percent

Major Component Description

Comad

Surface layer texture: Extremely bouldery sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Excessively drained

Dominant parent material: Material weathered from intrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 1.4 inches

Elkner

Surface layer texture: Bouldery sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Granitic colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.6 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

580D—Comad-Elkner complex, 8 to 15 percent slopes

Setting

Landform:

- Comad—Mountains
- Elkner—Mountains

Position on landform:

- Comad—Footslopes and toeslopes
- Elkner—Footslopes and toeslopes

Slope:

- Comad—8 to 15 percent
- Elkner—8 to 15 percent

Elevation: 5,800 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Comad and similar soils: 65 percent

Elkner and similar soils: 20 percent

Minor Components

Sandy clay loam subsoils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Crackerville and similar soils: 0 to 5 percent

Major Component Description

Comad

Surface layer texture: Very stony sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Excessively drained

Dominant parent material: Material weathered from intrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 1.6 inches

Elkner

Surface layer texture: Stony sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Granitic colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

580E—Comad-Elkner complex, 15 to 35 percent slopes

Setting

Landform:

- Comad—Mountains
- Elkner—Mountains

Position on landform:

- Comad—Backslopes and footslopes
- Elkner—Backslopes and footslopes

Slope:

- Comad—15 to 35 percent
- Elkner—15 to 35 percent

Elevation: 5,800 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Comad and similar soils: 65 percent

Elkner and similar soils: 20 percent

Minor Components

Sandy clay loam subsoils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Crackerville and similar soils: 0 to 5 percent

Major Component Description

Comad

Surface layer texture: Very stony sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Excessively drained

Dominant parent material: Material weathered from intrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 1.6 inches

Elkner

Surface layer texture: Stony sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Granitic colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

580F—Comad-Elkner complex, 35 to 60 percent slopes

Setting

Landform:

- Comad—Mountains
- Elkner—Mountains

Position on landform:

- Comad—Backslopes and shoulders
- Elkner—Backslopes and shoulders

Slope:

- Comad—35 to 60 percent
- Elkner—35 to 60 percent

Elevation: 5,800 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Comad and similar soils: 65 percent

Elkner and similar soils: 20 percent

Minor Components

Sandy clay loam subsoils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Crackerville and similar soils: 0 to 5 percent

Major Component Description

Comad

Surface layer texture: Very stony sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Excessively drained

Dominant parent material: Material weathered from intrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 1.6 inches

Elkner

Surface layer texture: Stony sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Granitic colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Con Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Stream terraces and alluvial fans

Parent material: Calcareous alluvium

Slope range: 0 to 60 percent

Elevation range: 3,600 to 6,400 feet

Annual precipitation: 10 to 14 inches

Annual air temperature: 39 to 44 degrees

Frost-free period: 90 to 105 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Aridic Haplustolls

Typical Pedon

Con loam, 0 to 4 percent slopes, in an area of cropland, 200 feet north and 2,300 feet west of the southeast corner of sec. 10, T. 10 N., R. 13 W.

A—0 to 8 inches; grayish brown (10YR 5/2) loam, dark brown (10YR 3/3) moist; moderate medium granular structure; soft, friable, slightly sticky, slightly plastic; many very fine and fine and common medium roots; few fine tubular pores; slightly alkaline; clear smooth boundary.

Bw—8 to 14 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine and few medium roots; common very fine and fine and few medium tubular pores; slightly alkaline; clear smooth boundary.

Bk1—14 to 23 inches; white (10YR 8/2) loam, very pale brown (10YR 7/4) moist; weak coarse

subangular blocky structure; slightly hard, friable, nonsticky, slightly plastic; few very fine and fine roots; common very fine and fine tubular pores; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; gradual smooth boundary.

Bk2—23 to 60 inches; white (10YR 8/2) loam, light yellowish brown (10YR 6/4) moist; weak coarse subangular blocky structure; slightly hard, friable, nonsticky, slightly plastic; few fine roots; common very fine and fine pores; 5 percent pebbles; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 10 inches

Depth to the calcic horizon: 11 to 18 inches

A horizon

Chroma: 1 to 3

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 35 percent—0 to 20 percent cobbles; 0 to 15 percent pebbles

Reaction: pH 6.1 to 7.3

Bw horizon

Value: 4 to 6 dry; 4 or 5 moist

Chroma: 3 or 4

Texture: Loam or clay loam

Clay content: 18 to 35 percent

Content of rock fragments: 0 to 15 percent pebbles

Reaction: 6.6 to 7.8

Bk1 horizon

Value: 7 or 8 dry; 5 to 7 moist

Chroma: 2 to 4

Texture: Loam, clay loam, or sandy loam

Clay content: 18 to 35 percent

Content of rock fragments: 0 to 20 percent—0 to 5 percent cobbles; 0 to 15 percent pebbles

Calcium carbonate equivalent: 15 to 40 percent

Reaction: 7.9 to 8.4

Bk2 horizon

Value: 5 to 8 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Loam or sandy 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

Calcium carbonate equivalent: 15 to 25 percent

Reaction: 7.9 to 8.4

24B—Con loam, 0 to 4 percent slopes**Setting**

Landform: Alluvial fans and stream terraces

Position on landform: Toeslopes

Slope: 0 to 4 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition**Major Components**

Con and similar soils: 85 percent

Minor Components

Anaconda and similar soils: 0 to 5 percent

Varney and similar soils: 0 to 5 percent

Sixbeacon and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

24C—Con loam, 4 to 8 percent slopes**Setting**

Landform: Alluvial fans and stream terraces

Position on landform: Toeslopes

Slope: 4 to 8 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition**Major Components**

Con and similar soils: 85 percent

Minor Components

Anaconda and similar soils: 0 to 5 percent

Varney and similar soils: 0 to 5 percent

Sixbeacon and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

24D—Con loam, 8 to 15 percent slopes**Setting**

Landform: Alluvial fans and stream terraces

Position on landform: Footslopes and toeslopes

Slope: 8 to 15 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition**Major Components**

Con and similar soils: 85 percent

Minor Components

Anaconda and similar soils: 0 to 5 percent

Varney and similar soils: 0 to 5 percent

Sixbeacon and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

824E—Con-Sixbeacon cobbly loams, 15 to 35 percent slopes

Setting

Landform:

- Con—Alluvial fans and stream terraces
- Sixbeacon—Alluvial fans and stream terraces

Position on landform:

- Con—Backslopes and footslopes
- Sixbeacon—Backslopes and footslopes

Slope:

- Con—15 to 35 percent
- Sixbeacon—15 to 35 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Con and similar soils: 55 percent

Sixbeacon and similar soils: 30 percent

Minor Components

Anaconda and similar soils: 0 to 5 percent

Varney and similar soils: 0 to 5 percent

Rothiemay and similar soils: 0 to 5 percent

Major Component Description

Con

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.4 inches

Sixbeacon

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

824F—Con-Sixbeacon cobbly loams, 35 to 60 percent slopes

Setting

Landform:

- Con—Alluvial fans and stream terraces
- Sixbeacon—Alluvial fans and stream terraces

Position on landform:

- Con—Backslopes and shoulders
- Sixbeacon—Backslopes and shoulders

Slope:

- Con—35 to 60 percent
- Sixbeacon—35 to 60 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Con and similar soils: 55 percent

Sixbeacon and similar soils: 30 percent

Minor Components

Anaconda and similar soils: 0 to 5 percent

Varney and similar soils: 0 to 5 percent

Rothiemay and similar soils: 0 to 5 percent

Major Component Description

Con

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.4 inches

Sixbeacon

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Copenhaver Series

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Mountains

Parent material: Material derived from argillite, andesite, and basalt

Slope range: 8 to 60 percent

Elevation range: 5,200 to 7,000 feet

Annual precipitation: 15 to 22 inches

Annual air temperature: 34 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Lithic Argicryolls

Typical Pedon

Copenhaver gravelly loam, in an area of Libeg-Copenhaver-Rock outcrop complex, 8 to 15 percent slopes, in an area of rangeland, 1,320 feet north and 1,700 feet west of the southeast corner of sec. 17, T. 7 N., R. 14 W.

A—0 to 6 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine roots; common very fine interstitial pores; 30 percent pebbles; neutral; clear smooth boundary.

Bt—6 to 12 inches; brown (7.5YR 5/2) very gravelly clay loam, brown (7.5YR 4/2) moist; moderate fine subangular blocky structure; hard, firm, moderately sticky, moderately plastic; many very fine roots; common very fine interstitial pores; few faint clay films on faces of peds; 5 percent cobbles and 45 percent pebbles; slightly alkaline; clear smooth boundary.

R—12 inches; argillite bedrock.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 16 inches

Depth to bedrock: 10 to 20 inches

A horizon

Hue: 10YR to 5YR

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 20 to 25 percent

Content of rock fragments: 15 to 35 percent—0 to 5 percent cobbles; 15 to 30 percent pebbles

Reaction: pH 6.6 to 7.3

Bt horizon

Hue: 5YR or 7.5YR

Value: 4 or 5 dry; 3 or 4 moist

Chroma: 2 or 3

Clay content: 27 to 35 percent

Content of rock fragments: 35 to 75 percent—5 to 15 percent cobbles; 30 to 60 percent pebbles

Reaction: pH 7.4 to 7.8

745D—Copenhaver-Libeg complex, 8 to 15 percent slopes

Setting

Landform:

- Copenhaver—Mountains
- Libeg—Mountains

Position on landform:

- Copenhaver—Foothills and toeslopes
- Libeg—Foothills and toeslopes

Slope:

- Copenhaver—8 to 15 percent
- Libeg—8 to 15 percent

Elevation: 5,200 to 7,000 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Copenhaver and similar soils: 50 percent

Libeg and similar soils: 35 percent

Minor Components

Moderately deep soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Redchief and similar soils: 0 to 5 percent

Major Component Description

Copenhaver

Surface layer texture: Gravelly loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.3 inches

Libeg

Surface layer texture: Channery loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Argillite colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

745E—Copenhaver-Libeg complex, 15 to 35 percent slopes

Setting

Landform:

- Copenhaver—Mountains
- Libeg—Mountains

Position on landform:

- Copenhaver—Backslopes and footslopes
- Libeg—Backslopes and footslopes

Slope:

- Copenhaver—15 to 35 percent
- Libeg—15 to 35 percent

Elevation: 5,200 to 7,000 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Copenhaver and similar soils: 50 percent

Libeg and similar soils: 35 percent

Minor Components

Moderately deep soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Redchief and similar soils: 0 to 5 percent

Major Component Description

Copenhaver

Surface layer texture: Gravelly loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.3 inches

Libeg

Surface layer texture: Channery loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Argillite colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

745F—Copenhaver-Libeg complex, 35 to 60 percent slopes

Setting

Landform:

- Copenhaver—Mountains
- Libeg—Mountains

Position on landform:

- Copenhaver—Backslopes and shoulders
- Libeg—Backslopes and shoulders

Slope:

- Copenhaver—35 to 60 percent
- Libeg—35 to 60 percent

Elevation: 5,200 to 7,000 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Copenhaver and similar soils: 50 percent

Libeg and similar soils: 35 percent

Minor Components

Moderately deep soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Redchief and similar soils: 0 to 5 percent

Major Component Description

Copenhaver

Surface layer texture: Gravelly loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.3 inches

Libeg

Surface layer texture: Channery loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained
Dominant parent material: Argillite colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Crackerville Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Moderate
Landform: Mountains
Parent material: Granitic residuum and colluvium
Slope range: 4 to 35 percent
Elevation range: 3,600 to 5,400 feet
Annual precipitation: 15 to 19 inches
Annual air temperature: 39 to 44 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Typic Argiustolls

Typical Pedon

Crackerville bouldery sandy loam, in an area of Clasoil-Crackerville complex, 8 to 15 percent slopes, in an area of rangeland, 2,640 feet south and 2,000 feet west of the northeast corner of sec. 22, T. 10 N., R. 12 W.

A—0 to 8 inches; dark grayish brown (10YR 4/2) bouldery sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine and fine discontinuous irregular pores; 20 percent boulders, 5 percent cobbles, and 5 percent pebbles; neutral; clear smooth boundary.

Bt1—8 to 13 inches; brown (10YR 5/3) very gravelly sandy clay loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; few fine tubular pores; common faint clay films on faces of peds;

15 percent boulders, 10 percent cobbles, and 35 percent pebbles; neutral; clear wavy boundary.
 Bt2—13 to 23 inches; brown (10YR 5/3) very gravelly sandy clay loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; common faint clay films on faces of peds; 15 percent boulders, 10 percent cobbles, and 35 percent pebbles; slightly alkaline; clear wavy boundary.

Cr—23 to 35 inches; light reddish brown (2.5Y 6/4) semiconsolidated granite bedrock.

R—35 inches; granite bedrock.

Range in Characteristics

Soil temperature: 40 to 44 degrees F
Moisture control section: Between 4 and 12 inches
Depth to the argillic horizon: 7 to 15 inches
Thickness of the mollic epipedon: 7 to 15 inches
Depth to the Cr horizon: 20 to 38 inches
Depth to the R horizon: 23 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: 14 to 20 percent
 Content of rock fragments: 5 to 35 percent—0 to 20 percent boulders; 0 to 10 percent cobbles; 5 to 25 percent pebbles
 Reaction: pH 5.1 to 7.3

Bt1 horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry; 3 or 4 moist
 Chroma: 3, 4, or 6 dry
 Texture: Sandy clay loam, clay loam, or loam
 Clay content: 20 to 30 percent
 Content of rock fragments: 35 to 60 percent—0 to 15 percent boulders; 0 to 15 percent cobbles; 35 to 45 percent pebbles
 Reaction: pH 6.6 to 7.8

Bt2 horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry; 3 or 4 moist
 Chroma: 3, 4 or 6 dry
 Texture: Loam, clay loam, or sandy clay loam
 Clay content: 20 to 30 percent
 Content of rock fragments: 35 to 60 percent—0 to 15 percent boulders; 0 to 10 percent cobbles; 35 to 50 percent pebbles
 Reaction: pH 6.6 to 7.8

Crow Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Slow

Landform: Mountains

Parent material: Colluvium derived from fine grained extrusive igneous rocks

Slope range: 4 to 35 percent

Elevation range: 3,600 to 6,400 feet

Annual precipitation: 18 to 30 inches

Annual air temperature: 38 to 42 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Fine, mixed, superactive, frigid
Typic Haplustalfs

Typical Pedon

Crow silt loam, in an area of Crow-Bignell complex, 15 to 35 percent slopes, in an area of woodland, 1,900 feet south and 1,400 feet west of the northeast corner of sec. 35, T. 12 N., R. 13 W.

Oi—2 inches to 0; slightly decomposed organic matter.

E—0 to 9 inches; pinkish gray (7.5YR 6/2) silt loam, brown (7.5YR 4/2) moist; strong fine granular structure; very hard, friable, slightly sticky, moderately plastic; many very fine and fine roots; common very fine and fine irregular pores; neutral; clear smooth boundary.

Bt/E—9 to 18 inches; B part (60 percent) is reddish brown (5YR 5/3) silty clay loam, reddish brown (5YR 4/3) moist; E part (40 percent) is pinkish gray (7.5YR 7/2) silt loam, brown (7.5YR 5/2) moist tongues; strong medium subangular blocky structure; very hard, firm, slightly sticky, moderately plastic; many fine and very fine and common medium roots; few very fine and fine irregular pores; few faint clay films on faces of peds; neutral; clear smooth boundary.

Bt1—18 to 29 inches; reddish brown (2.5YR 4/4) silty clay loam, dark reddish brown (2.5YR 3/4) moist; strong medium subangular blocky structure; extremely hard, firm, slightly sticky, moderately plastic; many fine and very fine and common medium roots; few very fine and fine irregular pores; common faint clay films on faces of peds; neutral; clear smooth boundary.

Bt2—29 to 60 inches; yellowish brown (10YR 5/6) silty clay loam, dark yellowish brown (10YR 4/6) moist; strong medium subangular blocky structure; extremely hard, firm, slightly sticky, moderately plastic; many fine and very fine and common medium roots; common very fine and

fine irregular pores; few faint clay films on faces of peds; neutral.

Range in Characteristics

Soil temperature: 40 to 47 degrees F

Moisture control section: Between 4 and 12 inches

E horizon

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: Loam, silt loam, or clay loam

Clay content: 10 to 35 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/E horizon

Hue: 5YR to 2.5Y

Value: B part—5 or 6 dry, 4 or 5 moist; E part—6 to 8 dry, 5 or 6 moist

Chroma: B part—2 to 4; E part—2 or 3

Texture: Silt loam, clay loam, or silty clay loam

Clay content: 20 to 40 percent (mixed)

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

Bt1 horizon

Hue: 2.5YR to 2.5Y

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 6

Texture: Silty clay loam, clay, or silty clay

Clay content: 35 to 60 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles

Reaction: pH 6.1 to 7.8

Bt2 horizon

Hue: 2.5YR to 2.5Y

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 6

Clay content: 27 to 35 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles

Reaction: pH 6.1 to 7.8

83D—Crow clay loam, 4 to 15 percent slopes

Setting

Landform: Mountains

Position on landform: Footslopes and toeslopes

Slope: 4 to 15 percent

Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 18 to 30 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Crow and similar soils: 85 percent

Minor Components

Bignell and similar soils: 0 to 5 percent
 Yreka and similar soils: 0 to 5 percent
 Danaher and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 9.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

83E—Crow silt loam, 15 to 35 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 18 to 30 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Crow and similar soils: 85 percent

Minor Components

Bignell and similar soils: 0 to 5 percent
 Yreka and similar soils: 0 to 5 percent
 Danaher and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silt loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained

Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 9.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

283D—Crow clay loam, moist, 4 to 15 percent slopes

Setting

Landform: Mountains
Position on landform: Footslopes and toeslopes
Slope: 4 to 15 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 18 to 30 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Crow and similar soils: 85 percent

Minor Components

Bignell and similar soils: 0 to 5 percent
 Yreka and similar soils: 0 to 5 percent
 Helmville and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 9.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

983D—Crow-Bignell complex, 8 to 15 percent slopes

Setting

Landform:

- Crow—Mountains
- Bignell—Mountains

Position on landform:

- Crow—Foothills and toeslopes
- Bignell—Foothills and toeslopes

Slope:

- Crow—8 to 15 percent
- Bignell—8 to 15 percent

Elevation: 3,600 to 6,000 feet

Mean annual precipitation: 18 to 30 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Crow and similar soils: 45 percent

Bignell and similar soils: 40 percent

Minor Components

Yreka and similar soils: 0 to 5 percent

Turrah and similar soils: 0 to 5 percent

Trapps and similar soils: 0 to 5 percent

Major Component Description

Crow

Surface layer texture: Silt loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 9.2 inches

Bignell

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

983E—Crow-Bignell complex, 15 to 35 percent slopes

Setting

Landform:

- Crow—Mountains
- Bignell—Mountains

Position on landform:

- Crow—Backslopes and foothills
- Bignell—Backslopes and foothills

Slope:

- Crow—15 to 35 percent
- Bignell—15 to 35 percent

Elevation: 3,600 to 6,000 feet

Mean annual precipitation: 18 to 30 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Crow and similar soils: 45 percent

Bignell and similar soils: 40 percent

Minor Components

Yreka and similar soils: 0 to 4 percent

Areas of rock outcrop: 0 to 4 percent

Moderately deep soils: 0 to 4 percent

Trapps and similar soils: 0 to 3 percent

Major Component Description

Crow

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 9.2 inches

Bignell

Surface layer texture: Gravelly clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Danaher Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Slow

Landform: Mountains

Parent material: Material derived from volcanic and extrusive igneous rocks

Slope range: 4 to 60 percent

Elevation range: 5,000 to 7,500 feet

Annual precipitation: 20 to 30 inches

Annual air temperature: 35 to 38 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Fine, mixed, superactive Ustic
Glossocryalfs

Typical Pedon

Danaher loam, 15 to 35 percent slopes, in an area of woodland, 650 feet south and 200 feet east of the northwest corner of sec. 19, T. 12 N., R. 14 W.

E—0 to 4 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; moderate fine granular structure; soft, very friable, slightly sticky, moderately plastic; many very fine and fine and few medium and coarse roots; many fine irregular pores; slightly acid; clear smooth boundary.

Bt/E—4 to 11 inches; B part (80 percent) is grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; E part (20 percent) is light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; strong medium subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; many very fine and fine and few medium and coarse roots; many fine irregular pores; few faint clay films on faces of peds; 5 percent pebbles; neutral; clear wavy boundary.

Bt1—11 to 21 inches; light brownish gray (2.5Y 6/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; hard, firm, moderately sticky, moderately plastic; common very fine and fine and few medium and coarse roots; many very fine and fine tubular pores; many faint clay films on faces of peds; 5 percent pebbles; neutral; gradual wavy boundary.

Bt2—21 to 34 inches; light yellowish brown (2.5Y 6/4) clay loam, light olive brown (2.5Y 5/4) moist; strong coarse subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; common very fine and fine and few medium and coarse roots; many fine and very fine tubular pores; common faint clay films on faces of peds; 5 percent pebbles; neutral; gradual wavy boundary.

Bt3—34 to 60 inches; pale yellow (2.5Y 7/4) clay loam, light olive brown (2.5Y 5/4) moist; moderate coarse subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; common fine and very fine and few medium and coarse roots; many very fine and fine tubular pores; few faint clay films on faces of peds; 15 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 37 to 42 degrees F

Moisture control section: Between 4 and 12 inches

E horizon

Hue: 2.5Y to 2.5YR

Value: 6 or 7 dry; 4 or 5 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

Reaction: pH 5.6 to 7.3

Bt/E horizon

Hue: 2.5Y to 2.5YR

Value: B part—4 or 5 dry, 3 or 4 moist; E part—
6 or 7 dry, 4 or 5 moist

Chroma: 2 or 3

Texture: Clay loam or loam

Clay content: 20 to 30 percent (mixed)

Content of rock fragments: 0 to 25 percent
pebbles

Reaction: pH 5.6 to 7.3

Bt horizons

Hue: 2.5Y to 2.5YR
 Value: 5 to 7 dry; 4 or 5 moist
 Chroma: 3, 4, or 6
 Texture: Clay loam or clay
 Clay content: 35 to 50 percent
 Content of rock fragments: 0 to 25 percent
 pebbles
 Reaction: pH 5.6 to 7.3

87D—Danaher loam, 4 to 15 percent slopes**Setting**

Landform: Mountains
Position on landform: Footslopes and toeslopes
Slope: 4 to 15 percent
Elevation: 5,800 to 7,500 feet
Mean annual precipitation: 22 to 28 inches
Frost-free period: 30 to 70 days

Composition**Major Components**

Danaher and similar soils: 85 percent

Minor Components

Foolhen and similar soils: 0 to 5 percent
 Loberg and similar soils: 0 to 5 percent
 Worock and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 9.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

87E—Danaher loam, 15 to 35 percent slopes**Setting**

Landform: Mountains
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent
Elevation: 5,800 to 7,500 feet
Mean annual precipitation: 22 to 28 inches
Frost-free period: 30 to 70 days

Composition**Major Components**

Danaher and similar soils: 85 percent

Minor Components

Foolhen and similar soils: 0 to 5 percent
 Loberg and similar soils: 0 to 5 percent
 Worock and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 9.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

387D—Danaher-Loberg complex, 8 to 15 percent slopes**Setting**

Landform:

- Danaher—Mountains
- Loberg—Mountains

Position on landform:

- Danaher—Foothslopes and toeslopes
- Loberg—Foothslopes and toeslopes

Slope:

- Danaher—8 to 15 percent
- Loberg—8 to 15 percent

Elevation: 5,000 to 7,500 feet*Mean annual precipitation:* 20 to 30 inches*Frost-free period:* 30 to 70 days**Composition****Major Components**

Danaher and similar soils: 55 percent

Loberg and similar soils: 30 percent

Minor Components

Worock and similar soils: 0 to 5 percent

Relyea and similar soils: 0 to 5 percent

Mannixlee and similar soils: 0 to 5 percent

Major Component Description**Danaher***Surface layer texture:* Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from
extrusive igneous rocks*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 9.0 inches**Loberg***Surface layer texture:* Gravelly loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from
extrusive igneous rocks*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 5.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

387E—Danaher-Loberg complex, 15 to 35 percent slopes**Setting***Landform:*

- Danaher—Mountains
- Loberg—Mountains

Position on landform:

- Danaher—Backslopes and foothslopes
- Loberg—Backslopes and foothslopes

Slope:

- Danaher—15 to 35 percent
- Loberg—15 to 35 percent

Elevation: 5,000 to 7,500 feet*Mean annual precipitation:* 20 to 30 inches*Frost-free period:* 30 to 70 days**Composition****Major Components**

Danaher and similar soils: 55 percent

Loberg and similar soils: 30 percent

Minor Components

Areas of rock outcrop: 0 to 4 percent

Worock and similar soils: 0 to 4 percent

Relyea and similar soils: 0 to 4 percent

Mannixlee and similar soils: 0 to 3 percent

Major Component Description**Danaher***Surface layer texture:* Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from
extrusive igneous rocks*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 9.0 inches**Loberg***Surface layer texture:* Gravelly loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from
extrusive igneous rocks*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 5.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

387F—Danaher-Loberg complex, 35 to 60 percent slopes

Setting

Landform:

- Danaher—Mountains
- Loberg—Mountains

Position on landform:

- Danaher—Backslopes and footslopes
- Loberg—Backslopes and shoulders

Slope:

- Danaher—35 to 60 percent
- Loberg—35 to 60 percent

Elevation: 5,000 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Danaher and similar soils: 55 percent

Loberg and similar soils: 30 percent

Minor Components

Worock and similar soils: 0 to 3 percent

Areas of rock outcrop: 0 to 3 percent

Relyea and similar soils: 0 to 3 percent

Elve and similar soils: 0 to 3 percent

Mannixlee and similar soils: 0 to 3 percent

Major Component Description

Danaher

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 9.0 inches

Loberg

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

487D—Danaher-Loberg-Elve complex, 8 to 15 percent slopes

Setting

Landform:

- Danaher—Mountains
- Loberg—Mountains
- Elve—Mountains

Position on landform:

- Danaher—Footslopes and toeslopes
- Loberg—Footslopes and toeslopes
- Elve—Footslopes and toeslopes

Slope:

- Danaher—8 to 15 percent
- Loberg—8 to 15 percent
- Elve—8 to 15 percent

Elevation: 5,800 to 7,500 feet

Mean annual precipitation: 20 to 28 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Danaher and similar soils: 35 percent

Loberg and similar soils: 30 percent

Elve and similar soils: 20 percent

Minor Components

Worock and similar soils: 0 to 5 percent

Foolhen and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Major Component Description

Danaher

Surface layer texture: Gravelly sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 7.9 inches

Loberg*Surface layer texture:* Gravelly sandy loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from extrusive igneous rocks*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 4.6 inches**Elve***Surface layer texture:* Very gravelly sandy loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Somewhat excessively drained*Dominant parent material:* Quartzite colluvium*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 4.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

**487E—Danaher-Loberg-Elve complex,
15 to 35 percent slopes****Setting***Landform:*

- Danaher—Mountains
- Loberg—Mountains
- Elve—Mountains

Position on landform:

- Danaher—Backslopes and footslopes
- Loberg—Backslopes and footslopes
- Elve—Backslopes and footslopes

Slope:

- Danaher—15 to 35 percent
- Loberg—15 to 35 percent
- Elve—15 to 35 percent

Elevation: 5,800 to 7,500 feet*Mean annual precipitation:* 20 to 28 inches*Frost-free period:* 30 to 70 days**Composition****Major Components**

Danaher and similar soils: 35 percent

Loberg and similar soils: 30 percent

Elve and similar soils: 20 percent

Minor Components

Worock and similar soils: 0 to 5 percent

Foolhen and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Major Component Description**Danaher***Surface layer texture:* Gravelly sandy loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from extrusive igneous rocks*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 7.9 inches**Loberg***Surface layer texture:* Gravelly sandy loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from extrusive igneous rocks*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 4.6 inches**Elve***Surface layer texture:* Very gravelly sandy loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Somewhat excessively drained*Dominant parent material:* Quartzite colluvium*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 4.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Danvers Series*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Permeability:* Slow*Landform:* Alluvial fans, stream terraces, and mountains*Parent material:* Calcareous alluvium*Slope range:* 0 to 60 percent*Elevation range:* 3,600 to 6,200 feet*Annual precipitation:* 15 to 19 inches

Annual air temperature: 39 to 44 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Fine, smectitic, frigid Vertic
 Argiustolls

Typical Pedon

Danvers clay loam, 4 to 8 percent slopes, in an area of rangeland, 900 feet south and 400 feet east of the northwest corner of sec. 4, T. 10 N., R. 13 W.

A—0 to 5 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure parting to moderate fine granular; slightly hard, very friable, moderately sticky, moderately plastic; many fine and very fine roots; many very fine irregular pores; neutral; clear smooth boundary.

Bt—5 to 17 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 5/3) moist; moderate fine subangular blocky structure; hard, friable, moderately sticky, moderately plastic; common fine and very fine roots; many very fine tubular pores; common faint clay films on faces of peds; neutral; clear smooth boundary.

Btk—17 to 28 inches; very pale brown (10YR 7/3) clay loam, grayish brown (10YR 5/2) moist; moderate medium subangular blocky structure; hard, friable, moderately sticky, moderately plastic; common fine and very fine roots; common fine tubular pores; few faint clay films on faces of peds; common fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk—28 to 60 inches; pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; weak coarse prismatic structure; very hard, friable, moderately sticky, moderately plastic; few fine roots; few very fine tubular pores; 5 percent cobbles and 5 percent pebbles; disseminated lime; common fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F
Moisture control section: Between 4 and 12 inches
Thickness of the mollic epipedon: 7 to 12 inches

A horizon

Hue: 7.5YR to 2.5Y
 Value: 4 or 5 dry; 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 35 percent—0 to 15 percent cobbles; 0 to 20 percent pebbles
 Reaction: pH 6.1 to 7.3

Bt horizon

Hue: 7.5YR to 2.5Y
 Value: 4 to 6 dry; 3 to 5 moist
 Chroma: 2 or 3
 Texture: Clay loam, silty clay loam, or silty clay
 Clay content: 30 to 50 percent
 Content of rock fragments: 0 to 10 percent pebbles
 Reaction: pH 6.6 to 7.8

Btk horizon

Hue: 7.5YR to 2.5Y
 Value: 5 to 7 dry; 4 to 6 moist
 Chroma: 2 or 3
 Texture: Clay loam, silty clay loam, or clay
 Clay content: 35 to 45 percent
 Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles
 Calcium carbonate equivalent: 10 to 15 percent
 Reaction: pH 7.4 to 8.4

Bk horizon

Hue: 7.5YR to 2.5Y
 Value: 6 to 8 dry; 5 or 6 moist
 Chroma: 1 to 3
 Clay content: 10 to 35 percent
 Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles
 Calcium carbonate equivalent: 15 to 35 percent
 Reaction: pH 7.4 to 8.4

49B—Danvers clay loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 0 to 4 percent
Elevation: 3,600 to 5,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Danvers and similar soils: 85 percent

Minor Components

Roy and similar soils: 0 to 5 percent
 Coben and similar soils: 0 to 4 percent
 Martinsdale and similar soils: 0 to 3 percent
 Ekah and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

49C—Danvers clay loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 3,600 to 5,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Danvers and similar soils: 85 percent

Minor Components

Roy and similar soils: 0 to 5 percent
 Coben and similar soils: 0 to 4 percent
 Martinsdale and similar soils: 0 to 3 percent
 Ekah and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

49D—Danvers clay loam, 8 to 15 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 3,600 to 5,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Danvers and similar soils: 85 percent

Minor Components

Roy and similar soils: 0 to 5 percent
 Martinsdale and similar soils: 0 to 4 percent
 Ekah and similar soils: 0 to 3 percent
 Coben and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

49E—Danvers clay loam, 15 to 35 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent

Elevation: 3,600 to 5,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Danvers and similar soils: 85 percent

Minor Components

Roy and similar soils: 0 to 5 percent
 Martinsdale and similar soils: 0 to 4 percent
 Ekah and similar soils: 0 to 3 percent
 Coben and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

149B—Danvers cobbly loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 0 to 4 percent
Elevation: 3,600 to 5,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Danvers and similar soils: 85 percent

Minor Components

Roy and similar soils: 0 to 5 percent
 Shawmut and similar soils: 0 to 5 percent
 Martinsdale and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

149C—Danvers cobbly loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 3,600 to 5,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Danvers and similar soils: 85 percent

Minor Components

Roy and similar soils: 0 to 5 percent
 Shawmut and similar soils: 0 to 5 percent
 Martinsdale and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

149D—Danvers cobbly loam, 8 to 15 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 3,600 to 5,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Danvers and similar soils: 85 percent

Minor Components

Roy and similar soils: 0 to 5 percent
 Shawmut and similar soils: 0 to 5 percent
 Martinsdale and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

446B—Danvers-Roy complex, 0 to 4 percent slopes

Setting

Landform:

- Danvers—Alluvial fans and stream terraces
- Roy—Alluvial fans and stream terraces

Position on landform:

- Danvers—Toeslopes
- Roy—Toeslopes

Slope:

- Danvers—0 to 4 percent
 - Roy—0 to 4 percent
- Elevation:* 3,600 to 5,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Danvers and similar soils: 50 percent
 Roy and similar soils: 35 percent

Minor Components

Shanley and similar soils: 0 to 5 percent
 Fergus and similar soils: 0 to 5 percent
 Winspect and similar soils: 0 to 5 percent

Major Component Description

Danvers

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.2 inches

Roy

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

446C—Danvers-Roy complex, 4 to 8 percent slopes

Setting

Landform:

- Danvers—Alluvial fans and stream terraces
- Roy—Alluvial fans and stream terraces

Position on landform:

- Danvers—Toeslopes
- Roy—Toeslopes

Slope:

- Danvers—4 to 8 percent
- Roy—4 to 8 percent

Elevation: 3,600 to 5,400 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days**Composition****Major Components**

Danvers and similar soils: 50 percent

Roy and similar soils: 35 percent

Minor Components

Shanley and similar soils: 0 to 5 percent

Fergus and similar soils: 0 to 5 percent

Winspect and similar soils: 0 to 5 percent

Major Component Description**Danvers***Surface layer texture:* Clay loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Alluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 6.2 inches**Roy***Surface layer texture:* Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from
extrusive igneous rocks*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

446D—Danvers-Roy complex, 8 to 15 percent slopes**Setting***Landform:*

- Danvers—Alluvial fans and stream terraces
- Roy—Alluvial fans and stream terraces

Position on landform:

- Danvers—Foothills and toeslopes
- Roy—Foothills and toeslopes

Slope:

- Danvers—8 to 15 percent
- Roy—8 to 15 percent

Elevation: 3,600 to 5,400 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days**Composition****Major Components**

Danvers and similar soils: 50 percent

Roy and similar soils: 35 percent

Minor Components

Shanley and similar soils: 0 to 5 percent

Fergus and similar soils: 0 to 5 percent

Winspect and similar soils: 0 to 5 percent

Major Component Description**Danvers***Surface layer texture:* Clay loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Alluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 6.2 inches**Roy***Surface layer texture:* Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from
extrusive igneous rocks*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

446E—Danvers-Roy complex, 15 to 35 percent slopes

Setting

Landform:

- Danvers—Alluvial fans and stream terraces
- Roy—Alluvial fans and stream terraces

Position on landform:

- Danvers—Backslopes and footslopes
- Roy—Backslopes and footslopes

Slope:

- Danvers—15 to 35 percent
- Roy—15 to 35 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Danvers and similar soils: 50 percent

Roy and similar soils: 35 percent

Minor Components

Shanley and similar soils: 0 to 5 percent

Fergus and similar soils: 0 to 5 percent

Winspect and similar soils: 0 to 5 percent

Major Component Description

Danvers

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.2 inches

Roy

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

446F—Danvers-Roy complex, 35 to 60 percent slopes

Setting

Landform:

- Danvers—Mountains
- Roy—Mountains

Position on landform:

- Danvers—Backslopes and shoulders
- Roy—Backslopes and shoulders

Slope:

- Danvers—35 to 60 percent
- Roy—35 to 60 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Danvers and similar soils: 50 percent

Roy and similar soils: 35 percent

Minor Components

Shanley and similar soils: 0 to 5 percent

Fergus and similar soils: 0 to 5 percent

Winspect and similar soils: 0 to 5 percent

Major Component Description

Danvers

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.2 inches

Roy

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

849B—Danvers-Coben clay loams, 2 to 4 percent slopes

Setting

Landform:

- Danvers—Alluvial fans and stream terraces
- Coben—Alluvial fans and stream terraces

Position on landform:

- Danvers—Toeslopes
- Coben—Toeslopes

Slope:

- Danvers—2 to 4 percent
- Coben—4 to 8 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Danvers and similar soils: 50 percent

Coben and similar soils: 35 percent

Minor Components

Ekah and similar soils: 0 to 8 percent

Martinsdale and similar soils: 0 to 7 percent

Major Component Description

Danvers

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.2 inches

Coben

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

849C—Danvers-Coben clay loams, 4 to 8 percent slopes

Setting

Landform:

- Danvers—Alluvial fans and stream terraces
- Coben—Alluvial fans and stream terraces

Position on landform:

- Danvers—Toeslopes
- Coben—Toeslopes

Slope:

- Danvers—4 to 8 percent
- Coben—4 to 8 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Danvers and similar soils: 50 percent

Coben and similar soils: 35 percent

Minor Components

Ekah and similar soils: 0 to 8 percent

Martinsdale and similar soils: 0 to 7 percent

Major Component Description

Danvers

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.2 inches

Coben

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

849D—Danvers-Coben clay loams, 8 to 15 percent slopes

Setting

Landform:

- Danvers—Alluvial fans and stream terraces
- Coben—Alluvial fans and stream terraces

Position on landform:

- Danvers—Foothills and toeslopes
- Coben—Foothills and toeslopes

Slope:

- Danvers—8 to 15 percent
- Coben—8 to 15 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Danvers and similar soils: 50 percent

Coben and similar soils: 35 percent

Minor Components

Ekah and similar soils: 0 to 8 percent

Martinsdale and similar soils: 0 to 7 percent

Major Component Description

Danvers

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.2 inches

Coben

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

DA—Denied access

Composition

Major Components

Denied access: 100 percent

Major Component Description

Definition: Areas where mapping access was denied by landowner

Dolus Series

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Sedimentary plains and hills

Parent material: Material derived from sandstone or siltstone

Slope range: 4 to 45 percent

Elevation range: 3,600 to 5,400 feet

Annual precipitation: 10 to 14 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 90 to 105 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Aridic Haplustolls

Typical Pedon

Dolus channery loam, in an area of Doney-Dolus complex, 15 to 45 percent slopes, in an area of rangeland, 2,400 feet north and 1,500 feet west of the southeast corner of sec. 4, T. 10 N., R. 12 W.

A—0 to 6 inches; grayish brown (2.5Y 5/2) channery loam, very dark grayish brown (2.5Y 3/2) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine tubular pores; 20 percent channers; slightly effervescent; slightly alkaline; clear smooth boundary.

Bw—6 to 14 inches; light brownish gray (2.5Y 6/2) channery loam, dark grayish brown (2.5Y 4/2) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; 30 percent channers; violently effervescent; moderately alkaline; clear smooth boundary.

Bk—14 to 28 inches; light gray (5Y 7/2) very channery coarse sandy loam, light olive gray (5Y 6/2) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; common fine and very fine roots; 40 percent channers; common fine masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

Cr—28 to 60 inches; semiconsolidated sandstone.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the Cr horizon: 20 to 40 inches

A horizon

Chroma: 2 or 3

Clay content: 15 to 25 percent

Content of rock fragments: 15 to 20 percent channers

Reaction: pH 6.6 to 7.8

Bw horizon

Value: 4 to 6 dry; 3 or 4 moist

Chroma: 2 to 4

Clay content: 15 to 27 percent

Content of rock fragments: 35 to 40 percent channers

Reaction: pH 7.9 to 8.4

Bk horizon

Hue: 10YR to 5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 or 3

Texture: Sandy loam, coarse sandy loam, or loam

Clay content: 15 to 27 percent

Content of rock fragments: 40 to 45 percent channers

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.9 to 8.4

168C—Dolus-Boxwell complex, 4 to 8 percent slopes

Setting

Landform:

- Dolus—Sedimentary plains
- Boxwell—Sedimentary plains

Position on landform:

- Dolus—Toeslopes
- Boxwell—Toeslopes

Slope:

- Dolus—4 to 8 percent
- Boxwell—4 to 8 percent

Elevation: 3,600 to 5,200 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Dolus and similar soils: 55 percent

Boxwell and similar soils: 30 percent

Minor Components

Tanna and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Doney and similar soils: 0 to 5 percent

Major Component Description

Dolus

Surface layer texture: Channery loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Interbedded siltstone and sandstone residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.7 inches

Boxwell

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Sandstone residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

268F—Dolus-Lap complex, 15 to 45 percent slopes

Setting

Landform:

- Dolus—Hills
- Lap—Hills

Position on landform:

- Dolus—Backslopes and footslopes
- Lap—Backslopes and footslopes

Slope:

- Dolus—15 to 45 percent
- Lap—15 to 45 percent

Elevation: 3,600 to 5,000 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Dolus and similar soils: 55 percent

Lap and similar soils: 30 percent

Minor Components

Areas of rock outcrop: 0 to 8 percent

Winspect and similar soils: 0 to 7 percent

Major Component Description

Dolus

Surface layer texture: Channery loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Interbedded siltstone and sandstone residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.7 inches

Lap

Surface layer texture: Loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Limestone residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Dominic Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate to the C horizon, rapid below

Landform: Stream terraces

Parent material: Alluvium

Slope range: 0 to 4 percent

Elevation range: 3,600 to 4,600 feet

Annual precipitation: 10 to 14 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 90 to 105 days

Taxonomic Class: Sandy-skeletal, mixed, frigid Typic Haplustolls

Typical Pedon

Dominic cobbly loam, 0 to 4 percent slopes, in an area of pasture, 2,600 feet north and 2,400 feet east of the southwest corner of sec. 25, T. 10 N., R. 13 W.

A1—0 to 6 inches; grayish brown (10YR 5/2) cobbly loam, very dark grayish brown (10YR 3/2) moist; weak medium granular structure; soft, very friable, slightly sticky, slightly plastic; many fine and very fine roots; many fine irregular pores; 15 percent cobbles and 10 percent pebbles; neutral; gradual smooth boundary.

A2—6 to 11 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; many fine and very fine roots; many very fine irregular pores; 20 percent cobbles and 25 percent pebbles; neutral; clear smooth boundary.

C1—11 to 22 inches; brown (10YR 5/3) very cobbly loamy sand, dark brown (10YR 4/3) moist; single grain; loose, nonsticky, nonplastic; many very fine and common fine roots; common very fine irregular pores; 20 percent cobbles and 25 percent pebbles; neutral; gradual wavy boundary.

C2—22 to 60 inches; brown (10YR 5/3) very cobbly sand; dark brown (10YR 4/3) moist; single grain; loose, nonsticky, nonplastic; few very fine roots;

many very fine irregular pores; 25 percent cobbles and 30 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 12 and 35 inches

Thickness of the mollic epipedon: 10 to 15 inches

A1 horizon

Hue: 7.5YR to 2.5Y

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 55 percent—5 to 20 percent cobbles; 10 to 35 percent pebbles

Reaction: pH 6.6 to 7.3

A2 horizon

Hue: 7.5YR to 2.5Y

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Texture: Loam or sandy loam

Clay content: 10 to 15 percent

Content of rock fragments: 35 to 60 percent—0 to 10 percent stones; 15 to 20 percent cobbles; 20 to 30 percent pebbles

Reaction: pH 6.6 to 7.3

C1 horizon

Hue: 7.5YR to 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Loamy sand or sand

Clay content: 0 to 10 percent

Content of rock fragments: 45 to 85 percent—0 to 20 percent stones; 20 to 30 percent cobbles; 25 to 35 percent pebbles

Reaction: pH 6.6 to 7.3

C2 horizon

Hue: 7.5YR to 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Loamy sand or sand

Clay content: 0 to 10 percent

Content of rock fragments: 50 to 80 percent—0 to 20 percent stones; 20 to 35 percent cobbles; 30 to 45 percent pebbles

Reaction: pH 6.6 to 7.3

1B—Dominic cobbly loam, 0 to 4 percent slopes

Setting

Landform: Stream terraces

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 3,600 to 4,600 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Dominic and similar soils: 85 percent

Minor Components

Dominic, greater slope: 0 to 5 percent

Cetrack loam and similar soils: 0 to 10 percent

Major Component Description

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Donald Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Slow

Landform: Stream terraces

Parent material: Alluvium

Slope range: 2 to 15 percent

Elevation range: 5,500 to 6,100 feet

Annual precipitation: 15 to 22 inches

Annual air temperature: 34 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Fine, smectitic Alfic Argicryolls

Typical Pedon

Donald loam, 4 to 8 percent slopes, in an area of rangeland, 1,500 feet north and 2,300 feet east of the southwest corner of sec. 17, T. 5 N., R. 14 W.

A1—0 to 5 inches; very dark gray (10YR 3/1) loam, black (10YR 2/1) moist; moderate medium subangular blocky structure parting to strong medium granular; hard, firm, slightly sticky, slightly plastic; many very fine, fine, and medium roots; many very fine tubular pores; 5 percent pebbles; neutral; clear smooth boundary.

A2—5 to 9 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure parting to strong medium granular; hard, firm, slightly sticky, slightly plastic; many very fine, fine, and medium roots; many very fine tubular pores; 5 percent stones and 5 percent pebbles; neutral; clear wavy boundary.

E—9 to 13 inches; pinkish gray (7.5YR 7/2) sandy loam, brown (7.5YR 5/2) moist; weak coarse subangular blocky structure; hard, firm, nonsticky, nonplastic; many very fine, fine, and medium roots; many fine irregular pores; 3 percent stones, 5 percent cobbles, and 5 percent pebbles; neutral; abrupt wavy boundary.

Bt1—13 to 16 inches; light brown (7.5YR 6/4) clay, brown (7.5YR 5/4) moist; strong medium columnar structure; very hard, very firm, very sticky, very plastic; common fine roots; few very fine and fine tubular pores; many continuous distinct unstained sand grains on tops of columns and discontinuous distinct unstained sand grains on vertical faces of peds; many distinct clay films on vertical faces of peds and in pores; neutral; clear wavy boundary.

Bt2—16 to 23 inches; light brown (7.5YR 6/4) clay, brown (7.5YR 5/4) moist; moderate medium prismatic structure; very hard, very firm, very sticky, very plastic; common fine roots; few very fine and fine tubular pores; many distinct clay films on faces of peds and in pores; slightly alkaline; clear wavy boundary.

Btk—23 to 35 inches; light brown (7.5YR 6/4) clay, brown (7.5YR 5/4) moist; moderate medium angular blocky structure; very hard, very firm, very sticky, very plastic; few fine roots; common fine and medium tubular pores; common distinct

clay films on faces of peds and in pores; common medium irregular seams of lime; slightly effervescent; moderately alkaline; clear wavy boundary.

BC—35 to 60 inches; light brown (7.5YR 6/4) clay; light brown (7.5YR 6/4) moist; massive; hard, firm, moderately sticky, moderately plastic; few fine tubular pores; moderately alkaline.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 13 inches

Depth to the Btk horizon: 21 to 40 inches

A1 horizon

Value: 2 or 3 dry

Chroma: 1 or 2

Clay content: 20 to 25 percent

Content of rock fragments: 0 to 10 percent—0 to 5 percent stones; 0 to 5 percent pebbles

Reaction: pH 6.6 to 7.3

A2 horizon

Value: 3 or 4 dry; 2 or 3 moist

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 10 percent—0 to 5 percent stones; 0 to 5 percent pebbles

Reaction: pH 6.6 to 7.3

E horizon

Value: 6 or 7 dry; 5 or 6 moist

Texture: Loam or sandy loam

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent stones; 0 to 5 percent cobbles; 0 to 5 percent pebbles

Reaction: pH 6.6 to 7.3

Bt1 horizon

Hue: 10YR or 7.5YR

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 3 or 4

Texture: Clay or clay loam

Clay content: 35 to 60 percent

Content of rock fragments: 0 to 5 percent pebbles

Reaction: pH 6.6 to 7.3

Bt2 horizon

Hue: 10YR or 7.5YR

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 3 or 4

Texture: Clay or clay loam

Clay content: 35 to 60 percent

Content of rock fragments: 0 to 5 percent pebbles

Reaction: pH 6.6 to 7.8

Btk horizon

Hue: 10YR or 7.5YR
 Value: 5 or 6 dry; 4 or 5 moist
 Chroma: 3 or 4
 Texture: Clay loam or clay
 Clay content: 35 to 60 percent
 Content of rock fragments: 0 to 5 percent pebbles
 Calcium carbonate equivalent: 1 to 5 percent
 Reaction: pH 7.4 to 8.4

BC horizon

Hue: 10YR or 7.5YR
 Value: 5 or 6 dry; 4 to 6 moist
 Chroma: 3 or 4
 Texture: Clay loam or clay
 Clay content: 35 to 60 percent
 Content of rock fragments: 0 to 5 percent pebbles
 Calcium carbonate equivalent: 0 to 5 percent
 Reaction: pH 7.4 to 8.4

28B—Donald loam, 2 to 4 percent slopes**Setting**

Landform: Stream terraces
Position on landform: Toeslopes
Slope: 2 to 4 percent
Elevation: 5,500 to 6,100 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 30 to 70 days

Composition**Major Components**

Donald and similar soils: 85 percent

Minor Components

Julius and similar soils: 0 to 5 percent
 Baggs and similar soils: 0 to 5 percent
 Libeg and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

28C—Donald loam, 4 to 8 percent slopes**Setting**

Landform: Stream terraces
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 5,500 to 6,100 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Composition**Major Components**

Donald and similar soils: 85 percent

Minor Components

Baggs and similar soils: 0 to 5 percent
 Julius and similar soils: 0 to 5 percent
 Libeg and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

28D—Donald loam, 8 to 15 percent slopes**Setting**

Landform: Stream terraces
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 5,500 to 6,100 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Donald and similar soils: 85 percent

Minor Components

Baggs and similar soils: 0 to 5 percent

Julius and similar soils: 0 to 5 percent

Libeg and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Doney Series

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Hills

Parent material: Semiconsolidated, silty sedimentary beds

Slope range: 15 to 45 percent

Elevation range: 3,600 to 5,400 feet

Annual precipitation: 12 to 16 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 90 to 105 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Typic Haplustepts

Typical Pedon

Doney cobbly loam, 15 to 35 percent slopes, in an area of rangeland, 100 feet north and 2,600 feet west of the southeast corner of sec. 16, T. 10 N., R. 13 W.

A—0 to 4 inches; grayish brown (10YR 5/2) cobbly loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure parting to weak fine granular; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; few very fine and fine tubular pores; 10 percent

cobbles and 5 percent pebbles; neutral; clear smooth boundary.

Bw—4 to 11 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many fine and very fine and common medium roots; common fine irregular pores; 5 percent cobbles and 15 percent pebbles; strongly effervescent; moderately alkaline; clear smooth boundary.

Bk1—11 to 17 inches; very pale brown (10YR 7/3) gravelly loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and very fine and common coarse roots; common fine irregular pores; 5 percent cobbles and 15 percent pebbles; common medium masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—17 to 27 inches; white (10YR 8/1) gravelly loam, light gray (2.5Y 7/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and very fine and common medium roots; few fine and very fine tubular pores; 5 percent cobbles and 15 percent pebbles; many medium masses of lime; violently effervescent; moderately alkaline; clear wavy boundary.

Cr—27 to 60 inches; light gray (2.5Y 7/2) semiconsolidated sedimentary beds that crush to loam.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the Cr horizon: 20 to 40 inches

A and Bw horizons

Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 1 to 3

Clay content: 18 to 27 percent

Content of rock fragments: 15 to 35 percent—5 to 10 percent cobbles; 5 to 25 percent pebbles

Reaction: pH 6.6 to 8.4

Bk horizons

Hue: 10YR or 2.5Y

Value: 6 to 8 dry; 5 to 7 moist

Chroma: 1 to 4

Texture: Loam, clay loam, or silty clay loam

Clay content: 18 to 30 percent

Content of rock fragments: 0 to 30 percent—0 to 10 percent cobbles; 0 to 20 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.9 to 9.0

169F—Doney-Dolus complex, 15 to 45 percent slopes

Setting

Landform:

- Doney—Hills
- Dolus—Hills

Position on landform:

- Doney—Backslopes and footslopes
- Dolus—Backslopes and footslopes

Slope:

- Doney—15 to 45 percent
- Dolus—15 to 45 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 12 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Doney and similar soils: 55 percent
Dolus and similar soils: 35 percent

Minor Components

Lap and similar soils: 0 to 4 percent
Areas of rock outcrop: 0 to 3 percent
Boxwell and similar soils: 0 to 3 percent

Major Component Description

Doney

Surface layer texture: Cobbly loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Semiconsolidated, silty sedimentary beds

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.9 inches

Dolus

Surface layer texture: Channery loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Interbedded siltstone and sandstone residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

369E—Doney cobbly loam, 15 to 35 percent slopes

Setting

Landform: Hills

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 12 to 16 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Doney and similar soils: 85 percent

Minor Components

Lap and similar soils: 0 to 5 percent
Areas of rock outcrop: 0 to 5 percent
Winspect and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Semiconsolidated, silty sedimentary beds

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Dougcliff Series

Depth class: Very deep (more than 60 inches)

Drainage class: Very poorly drained

Permeability: Moderately rapid

Landform: Closed depressions

Parent material: Peat

Slope range: 0 to 2 percent

Elevation range: 4,000 to 5,800 feet

Annual precipitation: 10 to 19 inches

Annual air temperature: 39 to 44 degrees

Frost-free period: 70 to 105 days

Taxonomic Class: Euic, frigid Typic Haplofibrists

Typical Pedon

Dougcliff mucky peat, 0 to 2 percent slopes, ponded, in an area of marshland, 900 feet south and 150 feet west of the northeast corner of sec. 3, T. 9 N., R. 13 W.

Oi1—0 to 8 inches; very dark grayish brown (10YR 3/2) mucky peat, grayish brown (10YR 5/2) dry; about 80 percent fiber, about 65 percent rubbed; massive; nonsticky, nonplastic; many very fine and fine and few medium roots; many very fine and fine tubular pores; strongly effervescent; slightly alkaline; clear wavy boundary.

Oi2—8 to 18 inches; black (10YR 2/1) mucky peat; very dark gray (10YR 3/1) dry; about 85 percent fiber, about 75 percent rubbed; massive; nonsticky, nonplastic; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear wavy boundary.

Oi3—18 to 32 inches; black (10YR 2/1) mucky peat, very dark gray (10YR 3/1) dry; about 80 percent fiber, about 70 percent rubbed; massive; nonsticky, nonplastic; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear wavy boundary.

C—32 to 36 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; massive; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine tubular pores; neutral; clear wavy boundary.

O'i—36 to 60 inches; very dark brown (10YR 2/2) mucky peat, very dark gray (10YR 3/1) dry; about 75 percent fiber, 60 percent rubbed; massive; nonsticky, nonplastic; many very fine and fine roots; many very fine tubular pores; neutral.

Range in Characteristics

Soil temperature: 40 to 47 degrees F

Depth to the seasonal high water table: 0 to 6 inches

Oi1 horizon

Hue: 10YR or 7.5YR

Value: 2 or 3 moist

Chroma: 1 or 2

Fiber content: 80 to 90 percent unrubbed; 65 to 75 percent rubbed

Reaction: pH 6.6 to 7.8

Oi2 horizon

Hue: 10YR or 7.5YR

Value: 2 or 3 moist

Chroma: 1 or 2

Fiber content: 85 to 95 percent unrubbed; 75 to 85 percent rubbed

Reaction: pH 6.6 to 7.8

Oi3 horizon

Hue: 10YR or 7.5YR

Value: 2 or 3 moist

Chroma: 1 or 2

Fiber content: 80 to 90 percent unrubbed; 70 to 80 percent rubbed

Reaction: pH 6.6 to 7.8

C horizon

Hue: 10YR or 7.5YR

Value: 2 or 3 moist; 3 to 5 dry

Chroma: 1 or 2

Reaction: pH 6.6 to 7.8

O'i horizon

Hue: 10 YR or 7.5YR

Value: 2 or 3 moist

Chroma: 1 or 2

Fiber content: 75 to 85 percent unrubbed; 60 to 75 percent rubbed

Reaction: pH 6.6 to 7.8

The Dougcliff soil is a taxadjunct to the series. It classifies as Euic, frigid Fluvaquentic Haplofibrists. This does not affect the use and management of the soil.

2A—Dougcliff mucky peat, 0 to 2 percent slopes, ponded

Setting

Landform: Closed depressions

Slope: 0 to 2 percent

Elevation: 4,000 to 5,800 feet

Mean annual precipitation: 10 to 19 inches

Frost-free period: 70 to 105 days

Composition

Major Components

Dougcliff and similar soils: 85 percent

Minor Components

Flintcreek and similar soils: 0 to 8 percent

Nythar and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Mucky-peat

Depth class: Very deep (more than 60 inches)

Drainage class: Very poorly drained

Dominant parent material: Peat

Native plant cover type: Rangeland

Flooding: None

Water table: Apparent

Available water capacity: Mainly 21.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

103A—Dumps, mine

Composition

Major Components

Dumps, mine: 85 percent

Major Component Description

Definition: Man-made deposits of crushed rock that are a product of mining activity

Dunkleber Series

Depth class: Very deep (more than 60 inches)

Drainage class: Very poorly drained

Permeability: Moderately rapid

Landform: Closed depressions

Parent material: Mucky peat

Slope range: 0 to 2 percent

Elevation range: 5,800 to 7,000 feet

Annual precipitation: 15 to 22 inches

Annual air temperature: 34 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Euic Typic Cryofibrists

Typical Pedon

Dunkleber mucky peat, 0 to 2 percent slopes, rarely flooded, 1,500 feet north and 1,300 feet west of the southeast corner of sec. 19, T. 5 N., R. 14 W.

Oi1—0 to 12 inches; black (10YR 2/1) mucky peat, dark gray (10YR 4/1) dry; about 80 percent fiber and raw herbaceous plant material, 70 percent rubbed; massive; nonsticky, nonplastic; slightly acid; clear smooth boundary.

Oi2—12 to 28 inches; very dark gray (10YR 3/1) mucky peat, dark gray (10YR 4/1) dry; about 85 percent fiber, 80 percent rubbed; massive;

nonsticky, nonplastic; slightly acid; clear smooth boundary.

Oi3—28 to 38 inches; black (10YR 2/1) mucky peat, dark gray (10YR 4/1) dry; about 80 percent fiber, 75 percent rubbed; massive; nonsticky, nonplastic; slightly acid; clear wavy boundary.

Oi4—38 to 44 inches; black (10YR 2/1) mucky peat, dark gray (10YR 4/1) dry; about 80 percent fiber, 75 percent rubbed; massive; nonsticky, nonplastic; slightly acid; clear smooth boundary.

Oi5—44 to 60 inches; black (10YR 2/1) mucky peat, very dark gray (10YR 3/1) dry; about 80 percent fiber, 75 percent rubbed; massive; nonsticky, nonplastic; slightly acid.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Depth to the seasonal high water table: Ponded to 6 inches

Thickness of organic material: Greater than 51 inches

Oi1 horizon

Value: 2 or 3 moist; 4 or 5 dry

Chroma: 1 or 2

Fiber content: 80 to 90 percent unrubbed; 60 to 75 percent rubbed

Reaction: pH 6.1 to 6.5

Oi2 horizon

Value: 2 to 4 moist; 3 to 5 dry

Chroma: 1 or 2

Fiber content: 80 to 90 percent unrubbed; 70 to 80 percent rubbed

Reaction: pH 6.1 to 6.5

Oi3 horizon

Value: 2 or 3 moist; 3 or 4 dry

Chroma: 1 or 2

Fiber content: 80 to 90 percent unrubbed; 70 to 80 percent rubbed

Reaction: pH 6.1 to 6.5

Oi4 horizon

Value: 2 or 3 moist; 4 or 5 dry

Chroma: 1 or 2

Fiber content: 80 to 90 percent unrubbed; 70 to 80 percent rubbed

Reaction: pH 6.1 to 6.5

Oi5 horizon

Value: 2 or 3 moist; 3 or 4 dry

Chroma: 1 or 2

Content of rock fragments: 0 to 35 percent pebbles

Reaction: pH 6.1 to 6.5

15A—Dunkleber mucky peat, 0 to 2 percent slopes, rarely flooded

Setting

Landform: Closed depressions

Slope: 0 to 2 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Dunkleber and similar soils: 85 percent

Minor Components

Foolhen and similar soils: 0 to 8 percent

Mooseflat and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Mucky-peat

Depth class: Very deep (more than 60 inches)

Drainage class: Very poorly drained

Dominant parent material: Peat

Native plant cover type: Rangeland

Flooding: Rare

Water table: Apparent

Available water capacity: Mainly 12.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Ekah Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Slow

Landform: Alluvial fans and stream terraces

Parent material: Alluvium

Slope range: 2 to 15 percent

Elevation range: 4,400 to 5,800 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Fine, smectitic, frigid Typic Argiustolls

Typical Pedon

Ekah loam, 2 to 4 percent slopes, in an area of rangeland, 250 feet south and 1,100 feet west of the northeast corner of sec. 19, T. 9 N., R. 13 W.

A1—0 to 3 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium platy structure parting to weak fine granular; slightly hard, very friable, slightly sticky, slightly plastic; many very fine roots; many fine interstitial pores; neutral; clear smooth boundary.

A2—3 to 6 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure parting to moderate very fine subangular blocky; slightly hard, friable, moderately sticky, moderately plastic; many very fine roots; many very fine tubular pores; neutral; abrupt smooth boundary.

Bt—6 to 13 inches; dark grayish brown (10YR 4/2) clay, dark brown (10YR 3/3) moist; strong medium subangular blocky structure parting to strong fine subangular blocky; hard, firm, very sticky, very plastic; many very fine roots; common fine and medium pores; common distinct clay films on faces of peds and in pores; neutral; clear smooth boundary.

Bk1—13 to 16 inches; pale brown (10YR 6/3) clay loam, dark brown (10YR 4/3) moist; weak coarse subangular blocky structure; hard, friable, slightly sticky, slightly plastic; few very fine roots; common fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk2—16 to 23 inches; white (10YR 8/2) clay loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; few very fine roots; many fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk3—23 to 28 inches; light gray (10YR 7/2) loam; pale brown (10YR 6/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; few very fine roots; many fine masses of lime; violently effervescent; moderately alkaline; clear wavy boundary.

BC—28 to 60 inches; very pale brown (10YR 7/3) gravelly loam; brown (10YR 5/3) moist; massive; soft, very friable, slightly sticky, slightly plastic; few very fine roots; 20 percent pebbles; few faint

lime coatings on pebbles; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

A horizons

Chroma: 1 or 2

Texture: Loam or clay loam

Clay content: 20 to 30 percent

Content of rock fragments: 0 to 35 percent—0 to 10 percent cobbles; 0 to 25 percent pebbles

Reaction: pH 6.6 to 7.3

Bt horizon

Value: 4 to 6 dry; 3 or 4 moist

Chroma: 2 or 3

Texture: Silty clay or clay

Clay content: 45 to 60 percent

Content of rock fragments: 0 to 10 percent pebbles

Reaction: pH 6.6 to 7.8

Bk horizons

Value: 6 to 8 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Loam, silty clay loam, or clay loam

Clay content: 25 to 40 percent

Content of rock fragments: 0 to 15 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.9 to 8.4

BC horizon

Value: 6 or 7 dry; 5 or 6 moist

Chroma: 2 to 4

Texture: Loam, clay loam, or silty clay loam

Clay content: 25 to 30 percent

Content of rock fragments: 0 to 25 percent pebbles

Reaction: pH 7.4 to 8.4

56B—Ekah loam, 2 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Toeslopes

Slope: 2 to 4 percent

Elevation: 4,400 to 5,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Ekah and similar soils: 85 percent

Minor Components

Danvers and similar soils: 0 to 5 percent

Coben and similar soils: 0 to 5 percent

Martinsdale and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

56C—Ekah loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Toeslopes

Slope: 4 to 8 percent

Elevation: 4,400 to 5,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Ekah and similar soils: 85 percent

Minor Components

Danvers and similar soils: 0 to 5 percent

Coben and similar soils: 0 to 5 percent

Martinsdale and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

56D—Ekah loam, 8 to 15 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Foothills and toeslopes
Slope: 8 to 15 percent
Elevation: 4,400 to 5,800 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Ekah and similar soils: 85 percent

Minor Components

Danvers and similar soils: 0 to 5 percent
 Coben and similar soils: 0 to 5 percent
 Martinsdale and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

256C—Ekah cobbly loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 4 to 8 percent

Elevation: 4,400 to 5,800 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Ekah and similar soils: 85 percent

Minor Components

Danvers and similar soils: 0 to 8 percent
 Coben and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

256D—Ekah cobbly loam, 8 to 15 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Foothills and toeslopes
Slope: 8 to 15 percent
Elevation: 4,400 to 5,800 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Ekah and similar soils: 85 percent

Minor Components

Danvers and similar soils: 0 to 8 percent
 Coben and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Elflint Series

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Stream terraces and alluvial fans

Parent material: Alluvium or colluvium derived from semiconsolidated tuff

Slope range: 15 to 35 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Ashy, glassy, frigid Vitrandic Haplustolls

Typical Pedon

Elflint loam, in an area of Roy-Carett-Elflint complex, 15 to 35 percent slopes, in an area of rangeland, 50 feet north and 400 feet east of the southwest corner of sec. 27, T. 6 N., R. 14 W.

A—0 to 8 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and medium roots; few medium and common fine tubular pores; slightly alkaline; clear wavy boundary.

Bk1—8 to 17 inches; white (10YR 8/2) loam, pale brown (10YR 6/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky, slightly plastic; common fine and few medium roots; common fine tubular pores; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—17 to 30 inches; white (10YR 8/2) loam, pale brown (10YR 6/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky, slightly plastic; few very fine and fine

roots; common very fine and fine tubular pores; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Cr1—30 to 48 inches; white (10YR 8/2) semiconsolidated tuff that crushes to loam, pale brown (10YR 6/3) moist.

Cr2—48 to 60 inches; white (10YR 8/2) semiconsolidated tuff that crushes to silt loam, light brownish gray (10YR 6/2) moist.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 10 inches

Depth to the Bk horizon: 8 to 10 inches

Depth to the Cr horizon: 20 to 40 inches

A horizon

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 10 to 27 percent

Volcanic glass: 30 to 40 percent

Acid oxalate extractable Al + 1/2 Fe: 0.10 to 0.25 percent

Moist bulk density: 1.1 to 1.3 g/cm³

Reaction: 7.4 to 7.8

Bk1 horizon

Value: 6 to 8 dry; 6 or 7 moist

Chroma: 2 or 3

Clay content: 9 to 15 percent

Volcanic glass: 30 to 40 percent

Acid oxalate extractable Al + 1/2 Fe: 0.10 to 0.25 percent

Moist bulk density: 1.2 to 1.4 g/cm³

Calcium Carbonate Equivalent: 15 to 25 percent

Reaction: 7.9 to 8.4

Bk2 horizon

Value: 6 to 8 dry; 6 or 7 moist

Chroma: 2 or 3

Clay content: 9 to 15 percent

Volcanic glass: 30 to 40 percent

Acid oxalate extractable Al + 1/2 Fe: 0.10 to 0.25 percent

Moist bulk density: 1.3 to 1.5 g/cm³

Calcium Carbonate Equivalent: 5 to 15 percent

Reaction: 7.9 to 8.4

Elkner Series

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Permeability: Moderately rapid

Landform: Mountains

Parent material: Colluvium derived from granite

Slope range: 2 to 60 percent

Elevation range: 5,600 to 7,500 feet

Annual precipitation: 20 to 30 inches

Annual air temperature: 35 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Coarse-loamy, mixed, superactive
Lamellic Eutrocryepts

Typical Pedon

Elkner stony sandy loam, in an area of Elkner-Ovando complex, 15 to 35 percent slopes, in an area of woodland, 2,600 feet south and 600 feet west of the northeast corner of sec. 3, T. 12 N., R. 14 W.

Oe—3 inches to 0; partially decomposed forest litter.

E1—0 to 8 inches; light brownish gray (10YR 6/2) stony sandy loam, dark grayish brown (10YR 4/2) moist; weak medium granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine, fine, medium, and very coarse roots; few fine and very fine irregular and tubular pores; 5 percent stones, 5 percent cobbles, and 5 percent pebbles; slightly acid; gradual wavy boundary.

E2—8 to 15 inches; light brownish gray (10YR 6/2) sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; soft, very friable, slightly sticky, slightly plastic; many fine and very fine, common medium, and few coarse roots; common fine and very fine irregular pores; 5 percent pebbles; slightly acid; clear smooth boundary.

E and Bt—15 to 38 inches; E part (75 percent) is light brownish gray (10YR 6/2) coarse sandy loam, grayish brown (10YR 5/2) moist; B part (25 percent) is yellowish brown (10YR 5/4) coarse sandy loam lamellae $\frac{1}{8}$ - to $\frac{1}{4}$ -inch thick, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine and few coarse roots; 10 percent pebbles; slightly acid; clear smooth boundary.

BC—38 to 60 inches; light brownish gray (10YR 6/2) gravelly coarse sandy loam; grayish brown (10YR 5/2) moist; massive; loose, nonsticky, nonplastic; few fine and very fine roots; 15 percent pebbles; slightly acid.

Range in Characteristics

Soil temperature: 39 to 44 degrees F

Moisture control section: Between 8 and 24 inches

E horizons

Value: 6 or 7 dry; 3 to 5 moist

Chroma: 2 to 4

Clay content: 5 to 10 percent

Content of rock fragments: 0 to 35 percent—0 to 35 percent stones and boulders; 0 to 5 percent cobbles; 0 to 20 percent pebbles

Reaction: pH 5.6 to 6.5

E and Bt horizon

Hue: E part—10YR; B part—10YR or 2.5Y

Value: E part—6 or 7 dry, 4 or 5 moist; B part—4 or 5 dry, 4 or 5 moist

Chroma: E part—2 to 4; B part—3 or 4

Clay content: 5 to 10 percent

Content of rock fragments: 0 to 10 percent pebbles

Reaction: pH 5.6 to 6.5

BC horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 3 to 5 moist

Chroma: 2 to 4

Clay content: 0 to 5 percent

Content of rock fragments: 10 to 25 percent—0 to 10 percent stones; 10 to 15 percent pebbles

Reaction: pH 5.6 to 6.5

80B—Elkner-Ovando complex, 2 to 8 percent slopes

Setting

Landform:

- Elkner—Mountains
- Ovando—Mountains

Position on landform:

- Elkner—Toeslopes
- Ovando—Toeslopes

Slope:

- Elkner—2 to 8 percent
- Ovando—2 to 8 percent

Elevation: 5,600 to 6,200 feet

Mean annual precipitation: 22 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Elkner and similar soils: 45 percent

Ovando and similar soils: 40 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Soils that are sandy below 7 inches: 0 to 5 percent

Soils that have very gravelly subsoils: 0 to 5 percent

Major Component Description

Elkner

Surface layer texture: Stony sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Granitic colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.1 inches

Ovando

Surface layer texture: Very stony sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Excessively drained
Dominant parent material: Granitic colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 1.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

80D—Elkner-Ovando complex, 8 to 15 percent slopes

Setting

Landform:

- Elkner—Mountains
- Ovando—Mountains

Position on landform:

- Elkner—Footslopes and toeslopes
- Ovando—Footslopes and toeslopes

Slope:

- Elkner—8 to 15 percent
- Ovando—8 to 15 percent

Elevation: 5,600 to 6,200 feet

Mean annual precipitation: 22 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Elkner and similar soils: 45 percent
 Ovando and similar soils: 40 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
 Soils that are sandy below 7 inches: 0 to 5 percent

Soils that have very gravelly subsoils: 0 to 5 percent

Major Component Description

Elkner

Surface layer texture: Stony sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Granitic colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.1 inches

Ovando

Surface layer texture: Very stony sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Excessively drained
Dominant parent material: Granitic colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 1.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

80E—Elkner-Ovando complex, 15 to 35 percent slopes

Setting

Landform:

- Elkner—Mountains
- Ovando—Mountains

Position on landform:

- Elkner—Backslopes and footslopes
- Ovando—Backslopes and footslopes

Slope:

- Elkner—15 to 35 percent
- Ovando—15 to 35 percent

Elevation: 5,600 to 6,200 feet

Mean annual precipitation: 22 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

- Elkner and similar soils: 45 percent
- Ovando and similar soils: 40 percent

Minor Components

- Areas of rock outcrop: 0 to 5 percent
- Soils that are sandy below 7 inches: 0 to 5 percent
- Soils that are loamy below 10 inches: 0 to 5 percent

Major Component Description

Elkner

Surface layer texture: Stony sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Granitic colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.1 inches

Ovando

Surface layer texture: Very stony sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Excessively drained
Dominant parent material: Granitic colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 1.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

80F—Elkner-Ovando stony sandy loams, 35 to 60 percent slopes

Setting

Landform:

- Elkner—Mountains
- Ovando—Mountains

Position on landform:

- Elkner—Backslopes and shoulders
- Ovando—Backslopes and shoulders

Slope:

- Elkner—35 to 60 percent
- Ovando—35 to 60 percent

Elevation: 5,600 to 6,200 feet

Mean annual precipitation: 22 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

- Elkner and similar soils: 45 percent
- Ovando and similar soils: 40 percent

Minor Components

- Areas of rock outcrop: 0 to 5 percent
- Soils that are sandy below 7 inches: 0 to 5 percent
- Soils that are loamy below 10 inches: 0 to 5 percent

Major Component Description

Elkner

Surface layer texture: Stony sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Granitic colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.4 inches

Ovando

Surface layer texture: Stony sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Excessively drained
Dominant parent material: Granitic colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

380D—Elkner sandy loam, 8 to 15 percent slopes

Setting

Landform: Mountains

Position on landform: Foothslopes and toeslopes

Slope: 8 to 15 percent

Elevation: 5,600 to 6,200 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Elkner and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 10 percent

Mooseflat and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Granitic colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

380E—Elkner sandy loam, 15 to 35 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 5,600 to 6,200 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Elkner and similar soils: 85 percent

Minor Components

Mooseflat and similar soils: 0 to 8 percent

Areas of rock outcrop: 0 to 7 percent

Major Component Description

Surface layer texture: Sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Granitic colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Elve Series

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Permeability: Moderately rapid

Landform: Mountains

Parent material: Colluvium derived from quartzite

Slope range: 4 to 80 percent

Elevation range: 5,800 to 7,500 feet

Annual precipitation: 20 to 28 inches

Annual air temperature: 35 to 38 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Ustic Eutrocrypts

Typical Pedon

Elve gravelly loam, 15 to 35 percent slopes, in an area of woodland, 1,500 feet north and 1,800 feet east of the southwest corner of sec. 18, T. 7 N., R. 14 W.

Oe—3 inches to 0; partially decomposed forest litter.

E—0 to 9 inches; light brownish gray (10YR 6/2)

gravelly loam, dark grayish brown (10YR 4/2)

moist; moderate fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine and

few medium roots; many very fine interstitial

pores; 5 percent cobbles and 15 percent pebbles;

slightly acid; clear smooth boundary.

Bw/E—9 to 22 inches; B part (65 percent) is

light reddish brown (5YR 6/3) very gravelly

loam, reddish brown (5YR 4/4) moist, E part

(35 percent) is pink (5YR 7/3) very gravelly loam,

reddish brown (5YR 5/4) moist; moderate fine

subangular blocky structure; slightly hard, friable,

nonsticky, nonplastic; many very fine and few

coarse roots; 15 percent cobbles and 35 percent

pebbles; slightly acid; gradual smooth boundary.

BC—22 to 60 inches; pink (5YR 7/3) very gravelly

loam; reddish brown (5YR 5/4) moist; weak

fine subangular blocky structure; soft, very

friable, nonsticky, nonplastic; few very fine roots;

15 percent cobbles and 35 percent pebbles;

slightly acid.

Range in Characteristics

Soil temperature: 40 to 45 degrees F

Moisture control section: Between 4 and 12 inches

E horizon

Hue: 10YR or 7.5YR

Value: 6 or 7 dry; 4 or 5 moist

Chroma: 2 to 4

Texture: Loam or sandy loam

Clay content: 10 to 20 percent

Content of rock fragments: 15 to 60 percent—0 to 15 percent cobbles; 15 to 45 percent pebbles

Reaction: pH 5.1 to 6.5

Bw/E horizon

Hue: 10YR or 7.5YR

Value: B part—5 or 6 dry, 4 or 5 moist; E part—6 or 7 dry, 4 or 5 moist

Chroma: B part—2 to 6; E part—2 to 4

Texture: Loam or sandy loam

Clay content: 10 to 20 percent

Content of rock fragments: 40 to 60 percent—15 to 20 percent cobbles; 25 to 40 percent pebbles

Reaction: pH 5.1 to 6.5

BC horizon

Hue: 10YR to 5YR

Value: 6 to 8 dry; 4 or 5 moist

Chroma: 3, 4, or 6

Texture: Loam or sandy loam

Clay content: 10 to 20 percent

Content of rock fragments: 40 to 60 percent—15 to 25 percent cobbles; 25 to 35 percent pebbles

Reaction: pH 5.1 to 6.5

82D—Elve gravelly loam, 4 to 15 percent slopes

Setting

Landform: Mountains

Position on landform: Footslopes and toeslopes

Slope: 4 to 15 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 20 to 25 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Elve and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Worock and similar soils: 0 to 5 percent

Evaro and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Quartzite colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

82E—Elve gravelly loam, 15 to 35 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 20 to 25 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Elve and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Evaro and similar soils: 0 to 5 percent

Worock and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Quartzite colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

82F—Elve gravelly loam, 35 to 60 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent
Elevation: 5,800 to 7,000 feet
Mean annual precipitation: 20 to 25 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Elve and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
 Evaro and similar soils: 0 to 5 percent
 Worock and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Quartzite colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

82G—Elve gravelly loam, 60 to 80 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 60 to 80 percent

Elevation: 5,800 to 7,000 feet
Mean annual precipitation: 20 to 25 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Elve and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
 Worock and similar soils: 0 to 5 percent
 Evaro and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Quartzite colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

382D—Elve gravelly loam, warm, 8 to 15 percent slopes

Setting

Landform: Mountains
Position on landform: Foothslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 5,800 to 7,000 feet
Mean annual precipitation: 20 to 25 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Elve and similar soils: 85 percent

Minor Components

Worock and similar soils: 0 to 5 percent
 Loberg and similar soils: 0 to 5 percent
 Evaro and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained

Dominant parent material: Quartzite colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

382E—Elve gravelly loam, warm, 15 to 35 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 20 to 25 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Elve and similar soils: 85 percent

Minor Components

Worock and similar soils: 0 to 5 percent

Loberg and similar soils: 0 to 5 percent

Evano and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Quartzite colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

482D—Elve gravelly loam, dry, 4 to 15 percent slopes

Setting

Landform: Mountains

Position on landform: Footslopes and toeslopes

Slope: 4 to 15 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 20 to 25 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Elve and similar soils: 85 percent

Minor Components

Loberg and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Worock and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Quartzite colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

482E—Elve gravelly loam, dry, 15 to 35 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 20 to 25 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Elve and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Loberg and similar soils: 0 to 5 percent

Worock and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Quartzite colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

482F—Elve gravelly loam, dry, 35 to 60 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and shoulders

Slope: 35 to 60 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 20 to 25 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Elve and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Loberg and similar soils: 0 to 5 percent

Worock and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Quartzite colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

982F—Elve-Rock outcrop complex, 35 to 60 slopes

Setting

Landform:

- Elve—Mountains
- Rock outcrop—Mountains

Position on landform:

- Elve—Backslopes and shoulders
- Rock outcrop—Backslopes and shoulders

Slope: 35 to 60 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 20 to 25 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Elve and similar soils: 50 percent

Rock outcrop: 35 percent

Minor Components

Loberg and similar soils: 0 to 4 percent

Whitore and similar soils: 0 to 3 percent

Worock and similar soils: 0 to 4 percent

Evoro and similar soils: 0 to 4 percent

Major Component Description

Elve

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Quartzite colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.8 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Evavo Series

Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Permeability: Moderately rapid
Landform: Mountains
Parent material: Colluvium derived from argillite
Slope range: 4 to 60 percent
Elevation range: 5,400 to 7,000 feet
Annual precipitation: 20 to 25 inches
Annual air temperature: 37 to 42 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Lamellic Eutrocryepts

Typical Pedon

Evavo gravelly loam, 15 to 35 percent slopes, in an area of woodland, 400 feet north and 900 feet east of the southwest corner of sec. 2, T. 12 N., R. 14 W.

Oi—2 inches to 0; slightly decomposed forest litter.

A—0 to 6 inches; light yellowish brown (10YR 6/4) gravelly loam, dark yellowish brown (10YR 4/4) moist; weak medium granular structure; soft, very friable, nonsticky, slightly plastic; many fine and medium roots; many fine pores; 25 percent pebbles; ash influenced; slightly acid; clear smooth boundary.

2E1—6 to 15 inches; light brownish gray (10YR 6/2) very gravelly loam, grayish brown (10YR 5/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; many fine and medium roots; common fine pores; 10 percent cobbles and 40 percent pebbles; slightly acid; clear wavy boundary.

2E2—15 to 23 inches; light gray (10YR 7/2) very gravelly sandy loam, grayish brown (10YR 5/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; common fine and medium roots; common fine pores; 10 percent cobbles and 45 percent pebbles; slightly acid; gradual wavy boundary.

2E and Bt—23 to 60 inches; E part (75 percent) is very pale brown (10YR 7/3) extremely gravelly sandy loam, brown (10YR 5/3) moist; B part (25 percent) is pale brown (10YR 6/3) extremely gravelly fine sandy loam lamellae $\frac{1}{16}$ - to $\frac{1}{4}$ -inch thick, brown (10YR 5/3) moist; weak fine

subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; few fine roots; common fine pores; 15 percent cobbles and 60 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 39 to 44 degrees F

Moisture control section: Between 8 and 24 inches

A horizon

Hue: 10YR or 7.5YR

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 3 or 4

Glass content: 35 to 60 percent

Clay content: 7 to 15 percent

Content of rock fragments: 15 to 35 percent—0 to 10 percent cobbles; 15 to 25 percent pebbles

Reaction: pH 5.6 to 6.5

2E horizons

Hue: 10YR or 7.5YR

Value: 6 to 8 dry; 5 to 7 moist

Chroma: 2 or 3

Texture: Loam or sandy loam

Clay content: 5 to 15 percent

Content of rock fragments: 40 to 55 percent—5 to 10 percent cobbles; 35 to 45 percent pebbles

Reaction: pH 5.6 to 7.3

2E and Bt horizon

Hue: 10YR or 7.5YR

Value: E part—6 or 7 dry, 4 to 6 moist; B part—5 or 6 dry, 4 or 5 moist

Chroma: E part—2 or 3; B part—3 or 4

Texture: Loam or sandy loam

Clay content: 5 to 18 percent

Content of rock fragments: 60 to 80 percent—5 to 15 percent cobbles; 55 to 65 percent pebbles

Reaction: pH 5.6 to 7.3

97D—Evavo gravelly loam, 8 to 15 percent slopes

Setting

Landform: Mountains

Position on landform: Footslopes and toeslopes

Slope: 8 to 15 percent

Elevation: 5,400 to 7,000 feet

Mean annual precipitation: 20 to 25 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Evavo and similar soils: 85 percent

Minor Components

Worock and similar soils: 0 to 5 percent
 Holloway and similar soils: 0 to 5 percent
 Elve and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Argillite colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

97E—Evaro gravelly loam, 15 to 35 percent slopes**Setting**

Landform: Mountains
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent
Elevation: 5,400 to 7,000 feet
Mean annual precipitation: 20 to 25 inches
Frost-free period: 30 to 70 days

Composition**Major Components**

Evaro and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 4 percent
 Worock and similar soils: 0 to 4 percent
 Holloway and similar soils: 0 to 4 percent
 Elve and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Argillite colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

97F—Evaro gravelly loam, 35 to 60 percent slopes**Setting**

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent
Elevation: 5,400 to 7,000 feet
Mean annual precipitation: 20 to 25 inches
Frost-free period: 30 to 70 days

Composition**Major Components**

Evaro and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
 Worock and similar soils: 0 to 4 percent
 Elve and similar soils: 0 to 3 percent
 Holloway and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Argillite colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

197D—Evaro gravelly loam, moist, 8 to 15 percent slopes**Setting**

Landform: Mountains
Position on landform: Backslopes and shoulders

Slope: 8 to 15 percent
Elevation: 5,400 to 7,000 feet
Mean annual precipitation: 20 to 25 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Evapo and similar soils: 85 percent

Minor Components

Worock and similar soils: 0 to 5 percent
 Elve and similar soils: 0 to 4 percent
 Loberg and similar soils: 0 to 3 percent
 Holloway and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Argillite colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

197E—Evapo gravelly loam, moist, 15 to 35 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 15 to 35 percent
Elevation: 5,400 to 7,000 feet
Mean annual precipitation: 20 to 25 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Evapo and similar soils: 85 percent

Minor Components

Worock and similar soils: 0 to 5 percent
 Elve and similar soils: 0 to 4 percent
 Loberg and similar soils: 0 to 3 percent
 Holloway and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Argillite colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

197F—Evapo gravelly loam, moist, 35 to 60 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent
Elevation: 5,400 to 7,000 feet
Mean annual precipitation: 20 to 25 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Evapo and similar soils: 85 percent

Minor Components

Worock and similar soils: 0 to 5 percent
 Elve and similar soils: 0 to 4 percent
 Loberg and similar soils: 0 to 3 percent
 Holloway and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Argillite colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Fairfield Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderately slow

Landform: Alluvial fans and stream terraces

Parent material: Alluvium and colluvium

Slope range: 2 to 35 percent

Elevation range: 3,600 to 4,600 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Typic Argiustolls

Typical Pedon

Fairfield loam, 4 to 8 percent slopes, in an area of rangeland, 1,800 feet north and 300 feet east of the southwest corner of sec. 12, T. 7 N., R. 14 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to moderate fine granular; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine irregular pores; slightly alkaline; clear wavy boundary.

Bt—4 to 8 inches; grayish brown (10YR 5/2) clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; common fine irregular pores; few faint clay films on faces of peds; slightly alkaline; clear wavy boundary.

Bk1—8 to 17 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; common very fine and fine pores; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—17 to 60 inches; very pale brown (10YR 7/3) loam; very pale brown (10YR 7/3) moist; weak coarse prismatic structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine and fine roots; many very fine and fine and few medium tubular pores; disseminated lime; few

fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 10 inches

Depth to the Bk horizon: 7 to 10 inches

A horizon

Hue: 10YR or 7.5YR

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 2 or 3

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 6.6 to 7.8

Bt horizon

Hue: 2.5Y to 7.5YR

Value: 4 or 5 dry; 3 or 4 moist

Chroma: 2 or 3

Texture: Clay loam, loam, or silty clay loam

Clay content: 25 to 35 percent

Content of rock fragments: 0 to 20 percent—0 to 5 percent cobbles; 0 to 15 percent pebbles

Reaction: pH 6.6 to 8.4

Bk horizons

Hue: 2.5Y to 7.5YR

Value: 5 to 8 dry; 4 to 7 moist

Chroma: 2 to 4

Texture: Loam, clay loam, or silty clay loam

Clay content: 25 to 35 percent

Content of rock fragments: 0 to 20 percent—0 to 5 percent cobbles; 0 to 15 percent pebbles

Electrical conductivity: 2 to 4 mmhos/cm

Calcium carbonate equivalent: 10 to 35 percent

Reaction: pH 7.9 to 8.4

43B—Fairfield loam, 2 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Toeslopes

Slope: 2 to 4 percent

Elevation: 3,600 to 4,600 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Fairfield and similar soils: 85 percent

Minor Components

Quigley and similar soils: 0 to 5 percent
 Martinsdale and similar soils: 0 to 5 percent
 Shawmut and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Argillite colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

43C—Fairfield loam, 4 to 8 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 3,600 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Fairfield and similar soils: 85 percent

Minor Components

Quigley and similar soils: 0 to 5 percent
 Martinsdale and similar soils: 0 to 5 percent
 Shawmut and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Argillite colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

43D—Fairfield loam, 8 to 15 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Foothlopes and toeslopes
Slope: 8 to 15 percent
Elevation: 3,600 to 4,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Fairfield and similar soils: 85 percent

Minor Components

Quigley and similar soils: 0 to 5 percent
 Martinsdale and similar soils: 0 to 5 percent
 Shawmut and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Argillite colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Fergus Series

Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Permeability: Moderately slow
Landform: Stream terraces, alluvial fans, and mountains
Parent material: Alluvium, colluvium and material weathered from extrusive igneous rocks
Slope range: 2 to 60 percent
Elevation range: 3,600 to 6,200 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 40 to 45 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Fine, smectitic, frigid Vertic
Argiustolls

Typical Pedon

Fergus loam, 4 to 8 percent slopes, in an area of rangeland, 2,100 feet north and 2,100 feet west of the southeast corner of sec. 14, T. 11 N., R. 14 W.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; few fine interstitial pores; 10 percent pebbles; neutral; clear wavy boundary.

A2—4 to 10 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; common fine tubular pores; 10 percent pebbles; neutral; clear wavy boundary.

Bt1—10 to 14 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; strong medium subangular blocky structure; hard, firm, moderately sticky, moderately plastic; many very fine and common medium roots; many very fine and common fine tubular pores; many faint clay films on faces of peds; 10 percent pebbles; neutral; clear smooth boundary.

Bt2—14 to 19 inches; reddish brown (5YR 5/3) clay, reddish brown (5YR 4/4) moist; moderate medium prismatic structure parting to moderate medium angular blocky; hard, firm, moderately sticky, moderately plastic; common fine roots; common fine irregular pores; many faint clay films on faces of peds; 10 percent pebbles; neutral; clear smooth boundary.

Bt3—19 to 25 inches; reddish brown (5YR 5/3) clay loam; reddish brown (5YR 4/3) moist; moderate coarse prismatic structure parting to moderate coarse angular blocky; hard, firm, moderately sticky, moderately plastic; few fine roots; common fine and very fine irregular pores; many faint clay films on faces of peds; 10 percent pebbles; moderately alkaline; clear smooth boundary.

Btk—25 to 39 inches; light reddish brown (5YR 6/3) clay loam, reddish brown (5YR 5/3) moist; weak coarse prismatic structure parting to moderate

coarse angular blocky; hard, firm, moderately sticky, moderately plastic; few fine roots; few fine and medium irregular pores; 10 percent pebbles; few faint clay films on faces of peds; common medium masses of lime; strongly effervescent; strongly alkaline; clear wavy boundary.

Bk—39 to 60 inches; light reddish brown (2.5YR 6/4) clay loam, reddish brown (2.5YR 4/4) moist; weak fine subangular blocky structure; hard, friable, sticky, moderately plastic; few very fine roots; 10 percent pebbles; common fine masses of lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

A horizons

Hue: 5YR to 10YR

Value: 3 to 5 dry; 2 or 3 moist

Clay content: 20 to 27 percent

Content of rock fragments: 0 to 10 percent pebbles

Reaction: pH 6.6 to 7.8

Bt1 horizon

Hue: 5YR to 10YR

Value: 4 or 5 dry; 3 or 4 moist

Chroma: 2 or 3

Texture: Silty clay loam, clay loam, or clay

Clay content: 35 to 50 percent

Content of rock fragments: 0 to 15 percent pebbles

Reaction: pH 6.6 to 7.8

Bt2 horizon

Hue: 2.5YR to 7.5YR

Value: 4 or 5 dry; 3 or 4 moist

Chroma: 2 to 6

Texture: Silty clay loam, clay loam, or clay

Clay content: 35 to 50 percent

Content of rock fragments: 0 to 15 percent pebbles

Reaction: pH 6.6 to 7.8

Bt3 horizon

Hue: 2.5YR to 7.5YR

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 6

Texture: Silty clay loam, clay loam, or clay

Clay content: 35 to 50 percent

Content of rock fragments: 0 to 15 percent pebbles

Reaction: pH 7.4 to 8.4

Btk and Bk horizons

Hue: 2.5YR to 7.5YR
 Value: 4 to 7 dry; 3 to 5 moist
 Chroma: 2 to 6
 Texture: Clay loam or clay
 Clay content: 27 to 45 percent
 Content of rock fragments: 0 to 15 percent
 pebbles
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: pH 7.9 to 9.0

140B—Fergus loam, 2 to 4 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 2 to 4 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Fergus and similar soils: 85 percent

Minor Components

Shanley and similar soils: 0 to 8 percent
 Danvers and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

140C—Fergus loam, 4 to 8 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes

Slope: 4 to 8 percent

Elevation: 3,800 to 6,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition**Major Components**

Fergus and similar soils: 85 percent

Minor Components

Shanley and similar soils: 0 to 8 percent
 Danvers and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium or colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

140D—Fergus loam, 8 to 15 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 3,800 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Fergus and similar soils: 85 percent

Minor Components

Shanley and similar soils: 0 to 8 percent
 Danvers and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium or colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

140E—Fergus loam, 15 to 35 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 3,800 to 6,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Fergus and similar soils: 85 percent

Minor Components

Shanley and similar soils: 0 to 8 percent

Danvers and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium or colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Fessler Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderately slow

Landform: Mountains

Parent material: Colluvium derived from calcareous argillite

Slope range: 15 to 60 percent

Elevation range: 3,600 to 6,400 feet

Annual precipitation: 18 to 25 inches

Annual air temperature: 38 to 42 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Pachic Argiustolls

Typical Pedon

Fessler gravelly loam, 15 to 35 percent slopes, in an area of woodland, 100 feet north and 1,200 feet west of the southeast corner of sec. 20, T. 11 N., R. 14 W.

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

A1—0 to 4 inches; black (10YR 2/1) gravelly loam; black (10YR 2/1) moist; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; many very fine irregular pores; 5 percent cobbles and 15 percent pebbles; slightly acid; clear smooth boundary.

A2—4 to 10 inches; very dark gray (10YR 3/1) very gravelly clay loam; black (10YR 2/1) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine and medium and common coarse roots; many very fine irregular pores; 15 percent cobbles and 30 percent pebbles; slightly acid; clear smooth boundary.

Bt1—10 to 29 inches; reddish brown (5YR 4/3) very cobbly clay loam, reddish brown (5YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, firm, slightly sticky, moderately plastic; many very fine and fine and common medium and coarse roots; many very fine tubular pores; many distinct clay films on faces of peds and in pores; 25 percent cobbles and 30 percent pebbles; slightly acid; clear wavy boundary.

Bt2—29 to 37 inches; reddish brown (5YR 5/3) very cobbly clay loam, reddish brown (5YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; common very fine and fine and few coarse roots; many very fine and common fine tubular pores; common distinct clay films on faces of peds; 25 percent cobbles and 30 percent pebbles; neutral; clear wavy boundary.

BC—37 to 60 inches; light reddish brown (5YR 6/3) very cobbly sandy clay loam, reddish brown (5YR 5/3) moist; weak medium subangular blocky

structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; common very fine tubular pores; few faint clay films on faces of peds; 25 percent cobbles and 25 percent pebbles; disseminated lime; few faint filaments of lime; few faint lime coatings on pebbles; slightly effervescent; slightly alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 16 to 30 inches

A1 horizon

Hue: 7.5YR or 10YR

Value: 2 or 3 dry; 2 or 3 moist

Clay content: 10 to 15 percent

Content of rock fragments: 15 to 35 percent—0 to 10 percent cobbles; 15 to 25 percent pebbles

Reaction: pH 6.1 to 7.3

A2 horizon

Hue: 7.5YR or 10YR

Value: 3 or 4 dry; 1, 2 or 3 moist

Chroma: 1 or 2

Texture: Loam or clay loam

Clay content: 20 to 30 percent

Content of rock fragments: 35 to 60 percent—0 to 5 percent stones; 5 to 15 percent cobbles; 30 to 40 percent pebbles

Reaction: pH 6.1 to 7.3

Bt1 horizon

Hue: 5YR to 10YR

Value: 3 to 5 dry

Chroma: 2 or 3

Texture: Clay loam or sandy clay loam

Clay content: 27 to 35 percent

Content of rock fragments: 35 to 70 percent—0 to 5 percent stones; 5 to 25 percent cobbles; 30 to 40 percent pebbles

Reaction: 6.1 to 7.3

Bt2 horizon

Hue: 5YR to 10YR

Value: 4 to 6 dry; 4 or 6 moist

Chroma: 3, 4, or 6

Texture: Clay loam or sandy clay loam

Clay content: 27 to 35 percent

Content of rock fragments: 35 to 70 percent—0 to 5 percent stones; 5 to 25 percent cobbles; 30 to 40 percent pebbles

Reaction: 6.6 to 7.3

BC horizon

Hue: 5YR to 10YR

Value: 6 or 7 dry; 5 or 6 moist

Chroma: 3, 4, or 6

Texture: Sandy clay loam or clay loam

Clay content: 20 to 30 percent

Content of rock fragments: 35 to 75 percent—0 to 5 percent stones; 10 to 25 percent cobbles; 25 to 45 percent pebbles

Calcium carbonate equivalent: 1 to 5 percent

Reaction: 6.6 to 7.8

94E—Fessler gravelly loam, 15 to 35 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Fessler and similar soils: 85 percent

Minor Components

Winkler and similar soils: 0 to 5 percent

Yreka and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Argillite colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 6.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

94F—Fessler gravelly loam, 35 to 60 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and shoulders

Slope: 35 to 60 percent
Elevation: 3,600 to 6,400 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Fessler and similar soils: 85 percent

Minor Components

Winkler and similar soils: 0 to 5 percent

Yreka and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Argillite colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 6.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Finn Series

Depth class: Very deep (more than 60 inches)
Drainage class: Poorly and very poorly drained
Permeability: Moderately slow
Landform: Flood plains, stream terraces, and alluvial fans
Parent material: Alluvium derived from mixed sources
Slope range: 0 to 4 percent
Elevation range: 5,400 to 7,200 feet
Annual precipitation: 15 to 22 inches
Annual air temperature: 34 to 39 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Typic Cryaquolls

Typical Pedon

Finn loam, 0 to 4 percent slopes, in an area of rangeland, 200 feet north and 1,000 feet west of the southeast corner of sec. 20, T. 8 N., R. 15 W.

Oi—2 inches to 0; partially decomposed organic matter.

A—0 to 7 inches; black (10YR 2/1) loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; soft, friable, slightly sticky, slightly plastic; many very fine and fine roots; few very fine tubular pores; 5 percent pebbles; neutral; clear smooth boundary.

Bg—7 to 11 inches; very dark gray (10YR 3/1) loam, gray (10YR 5/1) dry; many fine prominent yellowish brown (10YR 5/8) and brownish yellow (10YR 6/8) dry redox concentrations; weak medium subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; many very fine and fine roots; common very fine tubular pores; 5 percent cobbles and 5 percent pebbles; neutral; clear smooth boundary.

Cg1—11 to 19 inches; grayish brown (10YR 5/2) very cobbly loam, white (10YR 8/1) dry; many fine permanent yellowish brown (10YR 5/8) and brownish yellow (10YR 6/8) dry redox concentrations; weak fine subangular blocky structure; soft, very friable, nonsticky, slightly plastic; common very fine roots; few very fine interstitial pores; 15 percent cobbles and 20 percent pebbles; neutral; clear smooth boundary.

Cg2—19 to 37 inches; brown (10YR 5/3) very cobbly sandy loam, white (10YR 8/1) dry; massive; soft, very friable, nonsticky, slightly plastic; few very fine roots; 20 percent cobbles and 20 percent pebbles; neutral; clear smooth boundary.

Cg3—37 to 60 inches; dark yellowish brown (10YR 4/4) very cobbly sandy clay loam, light yellowish brown (10YR 6/4) dry; massive; slightly hard, very friable, slightly sticky, nonplastic; few very fine roots; 20 percent cobbles and 20 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 36 to 41 degrees F
Moisture control section: Between 4 and 12 inches
Thickness of the mollic epipedon: 10 to 15 inches
Depth to the seasonal high water table: Ponded to 24 inches

A horizon

Value: 3 to 5 dry
 Chroma: 1 or 2
 Clay content: 18 to 27 percent
 Content of rock fragments: 10 to 35 percent—0 to 5 percent cobbles; 5 to 30 percent pebbles
 Reaction: 5.1 to 7.3

Bg horizon

Value: 3 or 4 moist; 5 or 6 dry
 Chroma: 1 to 4

Redox concentrations: 10YR 6/8, 5/8
 Clay content: 18 to 27 percent
 Content of rock fragments: 10 to 60 percent—5 to
 15 percent cobbles; 5 to 45 percent pebbles
 Reaction: 5.1 to 7.3

C horizons

Value: 3 to 5 moist; 6 to 8 dry
 Chroma: 1 to 4
 Redox concentrations: 10YR 5/8, 6/8
 Texture: Loam, sandy loam, or sandy clay loam
 Clay content: 18 to 27 percent
 Content of rock fragments: 35 to 70 percent—
 15 to 25 percent cobbles; 20 to 45 percent
 pebbles
 Calcium carbonate equivalent: 0 to 5 percent
 Reaction: 5.6 to 7.3

676B—Finn loam, 0 to 4 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 0 to 4 percent
Elevation: 5,400 to 7,200 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Composition**Major Components**

Finn and similar soils: 85 percent

Minor Components

Mooseflat and similar soils: 0 to 6 percent
 Foolhen and similar soils: 0 to 5 percent
 Dunkleber and similar soils: 0 to 4 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Apparent
Ponding: Brief
Available water capacity: Mainly 6.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

776B—Finn-Water complex, 0 to 4 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Treads
Slope: 0 to 4 percent
Elevation: 5,400 to 7,200 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Composition**Major Components**

Finn and similar soils: 70 percent
 Water: 15 percent

Minor Components

Mooseflat and similar soils: 0 to 6 percent
 Foolhen and similar soils: 0 to 5 percent
 Dunkleber and similar soils: 0 to 4 percent

Major Component Description**Finn**

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Apparent
Ponding: Brief
Available water capacity: Mainly 6.6 inches

Water

Definition: Areas of open water

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Flintcreek Series

Depth class: Very deep (more than 60 inches)
Drainage class: Very poorly drained
Permeability: Moderate to 24 inches, very rapid below
Landform: Stream terraces, alluvial fans, and flood
 plains
Parent material: Alluvium
Slope range: 0 to 4 percent
Elevation range: 3,600 to 6,000 feet
Annual precipitation: 10 to 19 inches

Annual air temperature: 39 to 44 degrees

Frost-free period: 70 to 105 days

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Cumulic Endoaquolls

Typical Pedon

Flintcreek loam, in an area of Nythar-Flintcreek complex, 0 to 4 percent slopes, in an area of pasture, 2,300 feet north and 1,000 feet east of the southwest corner of sec. 26, T. 6 N., R. 14 W.

Oe—2 inches to 0; decomposed organic mat.

A—0 to 12 inches; very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) dry; many very fine and fine distinct brownish yellow (10YR 6/8) redox concentrations; moderate fine granular structure; soft, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine interstitial pores; neutral; gradual wavy boundary.

Bg—12 to 24 inches; black (10YR 2/1) stratified gravelly loam and gravelly silt loam, dark gray (10YR 4/1) dry; many very fine distinct brownish yellow (10YR 6/8) redox concentrations; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; few very fine interstitial pores; 5 percent cobbles, 10 percent pebbles; neutral; clear smooth boundary.

2Cg—24 to 60 inches; very dark grayish brown (10YR 3/2) extremely gravelly loamy sand, gray (10YR 5/1) dry; many very fine distinct brownish yellow (10YR 6/8) redox concentrations; single grain; loose, nonsticky, nonplastic; common very fine roots; 15 percent cobbles, 45 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 24 to 60 inches

Depth to the seasonal high water table: 0 to 12 inches

Depth to the 2Cg horizon: 20 to 40 inches

A horizon

Value: 2 or 3 moist; 4 or 5 dry

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 6.6 to 7.3

Bg horizon

Value: 2 or 3 moist; 4 or 5 dry

Chroma: 1 or 2

Texture: Loam, sandy loam, clay loam, or silt loam

Clay content: 18 to 35 percent

Content of rock fragments: 15 to 35 percent—5 to 10 percent cobbles; 10 to 25 percent pebbles

Reaction: 6.6 to 7.3

2Cg horizon

Value: 3 to 5 moist; 4 to 6 dry

Chroma: 1 or 2

Texture: Loamy sand or sand

Clay content: 5 to 15

Content of rock fragments: 50 to 80 percent—10 to 20 percent cobbles; 40 to 60 percent pebbles

Reaction: 6.6 to 7.3

Foolhen Series

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly or very poorly drained

Permeability: Moderate

Landform: Stream terraces and alluvial fans

Parent material: Alluvium derived from mixed sources

Slope range: 0 to 8 percent

Elevation range: 5,800 to 6,500 feet

Annual precipitation: 15 to 22 inches

Annual air temperature: 34 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Fine-loamy, mixed, superactive Typic Cryaquolls

Typical Pedon

Foolhen loam, 0 to 4 percent slopes, in an area of rangeland, 2,400 feet south and 1,400 feet east of the northwest corner of sec. 12, T. 5 N., R. 14 W.

Oi—2 inches to 0; partially decomposed organic matter.

A—0 to 7 inches; very dark brown (10YR 2/2) loam, very dark grayish brown (10YR 3/2) dry; weak fine granular structure; soft, very friable, slightly sticky, nonplastic; many very fine and fine roots; common very fine irregular pores; neutral; gradual wavy boundary.

Bg—7 to 18 inches; very dark grayish brown (10YR 3/2) sandy loam, grayish brown (10YR 5/2) dry; many medium distinct light olive brown (2.5Y 5/6) and olive yellow (2.5Y 6/6) dry redox concentrations; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; many very fine and fine roots; common very fine irregular pores; neutral; gradual wavy boundary.

Cg1—18 to 25 inches; dark yellowish brown (10YR 4/4) sandy loam with lenses of loamy sand 1- to 2-inches thick, light yellowish brown (10YR 6/4) dry; many medium distinct light olive brown (2.5Y 5/6) and olive yellow (2.5Y 6/6) dry redox concentrations, massive; soft, very friable, slightly sticky, nonplastic; many very fine and fine roots; common very fine irregular pores; slightly alkaline; gradual wavy boundary.

Cg2—25 to 44 inches; light olive brown (2.5Y 5/6) gravelly loam, olive yellow (2.5Y 6/6) dry; many medium distinct yellowish brown (10YR 5/8) and brownish yellow (10YR 6/8) dry redox concentrations; massive; hard, friable, slightly sticky, slightly plastic; few very fine and fine roots; few fine irregular pores; 25 percent pebbles; slightly alkaline; gradual wavy boundary.

Cg3—44 to 60 inches; light olive brown (2.5Y 5/6) gravelly loam, yellow (2.5Y 7/6) dry; many medium distinct yellowish brown (10YR 5/8) and brownish yellow (10YR 6/8) dry redox concentrations; massive; hard, friable, slightly sticky, moderately plastic; few very fine and fine roots; few fine tubular pores; 30 percent pebbles; slightly alkaline.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 10 to 19 inches

Depth to the seasonal high water table: Ponded to 18 inches

A horizon

Value: 2 or 3 dry

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 6.6 to 7.3

Bg horizon

Value: 2 or 3 moist; 4 or 5 dry

Redox concentrations: 2.5Y 5/6 and 2.5Y 6/6

Texture: Loam or sandy 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 6.6 to 7.3

Cg1 horizon

Value: 4 or 5 moist; 6 or 7 dry

Redox concentrations: 2.5Y 5/6 and 2.5Y 6/6

Texture: Loam, silt loam, or sandy 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 6.6 to 7.8

Cg2 and Cg3 horizons

Hue: 2.5Y or 10YR

Value: 4 to 6 moist; 6 or 7 dry

Chroma: 1, 4, or 6

Redox concentrations: 10YR 5/8, 10YR 6/8, 5YR 4/8, and 5YR 5/8

Texture: Loam, silt loam, or sandy loam

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 35 percent—0 to 5 percent cobbles; 0 to 30 percent pebbles

Calcium carbonate equivalent: 0 to 15 percent

Reaction: pH 7.4 to 8.4

3B—Foolhen loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 5,800 to 6,500 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Foolhen and similar soils: 85 percent

Minor Components

Mooseflat and similar soils: 0 to 6 percent

Finn and similar soils: 0 to 5 percent

Dunkleber and similar soils: 0 to 4 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Apparent

Ponding: Brief

Available water capacity: Mainly 8.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

3C—Foolhen loam, 4 to 8 percent slopes**Setting**

Landform: Alluvial fans and stream terraces

Position on landform: Treads

Slope: 4 to 8 percent

Elevation: 5,800 to 6,500 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition**Major Components**

Foolhen and similar soils: 85 percent

Minor Components

Mooseflat and similar soils: 0 to 6 percent

Dunkleber and similar soils: 0 to 5 percent

Finn and similar soils: 0 to 4 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Apparent

Ponding: Brief

Available water capacity: Mainly 8.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

903B—Foolhen loam, wet, 0 to 4 percent slopes, rarely flooded**Setting**

Landform: Flood plains

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 5,800 to 6,500 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition**Major Components**

Foolhen and similar soils: 85 percent

Minor Components

Moose flat and similar soils: 0 to 6 percent

Dunkleber and similar soils: 0 to 5 percent

Finn and similar soils: 0 to 4 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Very poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Apparent

Available water capacity: Mainly 8.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Gregson Series

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Moderate to the 2C horizon, rapid below

Landform: Low stream terraces, alluvial fans, and flood plains

Parent material: Alluvium

Slope range: 0 to 4 percent

Elevation range: 4,000 to 5,200 feet

Annual precipitation: 10 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 105 days

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Aquic Haplustolls

Typical Pedon

Gregson silt loam, cool, 0 to 4 percent slopes, in an area of pasture, 800 feet north and 2,250 feet west of the southeast corner of sec. 29, T. 10 N., R. 13 W.

Oe—1 inch to 0; partially decomposed organic matter
Ap—0 to 7 inches; very dark gray (N 3/) silt loam, black (N 2.5/) moist; strong medium granular structure; slightly hard, friable, slightly sticky, moderately plastic; many fine and very fine roots; many fine and very fine pores; neutral; gradual wavy boundary.

A—7 to 13 inches; dark gray (10YR 4/1) loam, very dark gray (10YR 3/1) moist; moderate medium granular structure; slightly hard, friable, slightly sticky, moderately plastic; common fine and very fine roots; many fine and very fine pores; neutral; clear smooth boundary.

Bw—13 to 26 inches; pinkish gray (7.5YR 6/2) loam, brown (7.5YR 4/2) moist; common distinct strong brown (7.5YR 5/8) redox concentrations; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine and very fine roots; many fine and very fine pores; neutral; clear smooth boundary.

2C—26 to 60 inches; pink (7.5YR 7/4) very gravelly loamy sand; brown (7.5YR 5/4) moist; many distinct strong brown (7.5YR 5/8) redox concentrations; single grain; loose, nonsticky, nonplastic; few fine and very fine roots; common very fine pores; 10 percent cobbles and 30 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 14 inches

Depth to the 2C horizon: 20 to 40 inches

Depth to the seasonal high water table: 24 to 42 inches

A horizons

Value: 2 to 3 moist; 3 to 5 dry

Chroma: 0 to 2

Texture: Loam or silt loam

Clay content: 18 to 27 percent

Reaction: pH 6.6 to 7.8

Bw horizon

Value: 4 to 6 moist; 6 or 7 dry

Chroma: 2 or 3

Texture: Loam or clay loam

Clay content: 18 to 35 percent

Reaction: pH 6.6 to 7.8

2C horizon

Value: 5 or 6 moist; 6 or 7 dry

Chroma: 1 to 4

Texture: Loamy sand or sand

Clay content: 0 to 5 percent

Content of rock fragments: 35 to 60 percent—5 to 15 percent cobbles; 30 to 45 percent pebbles

Reaction: pH 6.6 to 7.8

434B—Gregson silt loam, cool, 0 to 4 percent slopes, rarely flooded

Setting

Landform: Flood plains

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 4,000 to 5,200 feet

Mean annual precipitation: 10 to 19 inches

Frost-free period: 70 to 105 days

Composition

Major Components

Gregson and similar soils: 85 percent

Minor Components

Blossberg and similar soils: 0 to 5 percent

Windlass and similar soils: 0 to 5 percent

Modesty and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silt loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Apparent

Available water capacity: Mainly 6.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

444B—Gregson silt loam, 0 to 4 percent slopes, rarely flooded

Setting

Landform: Flood plains

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 4,000 to 5,200 feet

Mean annual precipitation: 10 to 19 inches

Frost-free period: 70 to 105 days

Composition

Major Components

Gregson and similar soils: 85 percent

Minor Components

Blossberg and similar soils: 0 to 4 percent

Windlass and similar soils: 0 to 4 percent

Nirling and similar soils: 0 to 4 percent

Cetrack and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Silt loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Apparent

Available water capacity: Mainly 6.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

534B—Gregson silt loam, cool, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 4,000 to 5,200 feet

Mean annual precipitation: 10 to 19 inches

Frost-free period: 70 to 105 days

Composition

Major Components

Gregson and similar soils: 85 percent

Major Component Description

Surface layer texture: Silt loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Apparent

Available water capacity: Mainly 6.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

544B—Gregson silt loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 4,000 to 5,200 feet

Mean annual precipitation: 10 to 19 inches

Frost-free period: 70 to 105 days

Composition

Major Components

Gregson and similar soils: 85 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Apparent

Available water capacity: Mainly 6.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Hackney Series

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Sedimentary plains and hills

Parent material: Material derived from semiconsolidated shale

Slope range: 4 to 35 percent

Elevation range: 3,600 to 6,000 feet

Annual precipitation: 15 to 19 inches
Annual air temperature: 39 to 44 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Loamy, mixed, superactive, frigid, shallow Typic Haplustolls

Typical Pedon

Hackney loam, in an area of Tewfel-Hackney complex, 4 to 15 percent slopes, in an area of rangeland, 1,600 feet north and 1,900 feet east of the southwest corner of sec. 34, T. 11 N., R. 12 W.

A1—0 to 3 inches; dark gray (10YR 4/1) loam, very dark gray (10YR 3/1) moist; moderate fine granular structure; soft, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine tubular pores; neutral; clear smooth boundary.

A2—3 to 8 inches; dark gray (10YR 4/1) clay loam, very dark gray (10YR 3/1) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear smooth boundary.

Bw—8 to 13 inches; dark grayish brown (2.5Y 4/2) clay loam, very dark grayish brown (2.5Y 3/2) moist; moderate coarse subangular blocky structure; hard, firm, moderately sticky, moderately plastic; many very fine roots; many very fine tubular pores; neutral; clear smooth boundary.

Cr—13 to 60 inches; semiconsolidated shale.

Range in Characteristics

Soil temperature: 41 to 46 degrees F
Moisture control section: Between 4 and 12 inches
Thickness of the mollic epipedon: 7 to 15 inches
Depth to the Cr horizon: 10 to 20 inches

A1 horizon

Value: 4 or 5 dry; 3 or 4 moist
 Chroma: 1 to 3
 Clay content: 18 to 27 percent
 Reaction: pH 6.6 to 7.3

A2 horizon

Value: 4 or 5 dry
 Chroma: 1 or 2
 Texture: Clay loam or loam
 Clay content: 18 to 30 percent
 Reaction: pH 6.6 to 7.3

Bw horizon

Value: 4 or 5 dry; 3 or 4 moist
 Chroma: 1 or 2

Clay content: 27 to 35 percent
 Reaction: pH 6.6 to 7.3

Helmville Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderately slow

Landform: Mountains

Parent material: Colluvium from limestone

Slope range: 8 to 60 percent

Elevation range: 4,600 to 7,500 feet

Annual precipitation: 20 to 30 inches

Annual air temperature: 35 to 38 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Eutric Haplocryalfs

Typical Pedon

Helmville cobbly loam, cool, 35 to 60 percent slopes, in an area of woodland, 1,400 feet north and 1,800 feet east of the southwest corner of sec. 18, T. 12 N., R. 13 W.

Oi—2 inches to 0; partly decomposed organic matter.

E—0 to 8 inches; yellowish brown (10YR 5/4) cobbly loam, dark brown (7.5YR 3/4) moist; weak fine granular structure; soft, friable, nonsticky, nonplastic; many very fine, fine, and medium roots; many very fine and fine discontinuous irregular pores; 15 percent cobbles and 15 percent pebbles; neutral; gradual wavy boundary.

Bt1—8 to 12 inches; dark yellowish brown (10YR 4/4) very cobbly clay loam, brown (7.5YR 4/4) moist; weak fine subangular blocky structure parting to weak medium granular; slightly hard, friable, slightly sticky, moderately plastic; many very fine, common medium, and few coarse roots; many very fine and fine discontinuous irregular pores; many faint continuous clay films on faces of peds; 25 percent cobbles and 20 percent pebbles; neutral; gradual wavy boundary.

Bt2—12 to 23 inches; brownish yellow (10YR 6/6) very cobbly clay loam; yellowish brown (10YR 5/6) moist; weak medium subangular blocky structure; slightly hard, friable, moderately sticky, moderately plastic; common very fine, fine, and medium roots; many very fine and fine discontinuous irregular pores; many faint clay films on faces of peds; 30 percent cobbles and 25 percent pebbles; slightly alkaline; clear smooth boundary.

Bk—23 to 60 inches; brownish yellow (10YR 6/6) very cobbly clay loam; yellowish brown (10YR 5/6) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine and fine roots; many very fine and fine discontinuous irregular pores; 30 percent cobbles and 30 percent pebbles; disseminated lime; many distinct lime casts on undersides of fragments; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 37 to 42 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the Bk horizon: 15 to 40 inches

E horizon

Hue: 10YR or 7.5YR

Value: 5 to 7 dry; 3 to 5 moist

Chroma: 2 to 4

Clay content: 18 to 27 percent

Content of rock fragments: 15 to 35 percent—0 to 20 percent stones and cobbles; 5 to 30 percent pebbles

Reaction: pH 5.6 to 7.3

Bt1 horizon

Hue: 10YR or 7.5YR

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 4 or 6

Clay content: 27 to 35 percent

Content of rock fragments: 30 to 60 percent—10 to 35 percent stones and cobbles; 15 to 40 percent pebbles

Reaction: pH 6.1 to 7.8

Bt2 horizon

Hue: 10YR or 7.5YR

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 4 or 6

Clay content: 27 to 35 percent

Content of rock fragments: 35 to 60 percent—10 to 35 percent stones and cobbles; 15 to 40 percent pebbles

Reaction: pH 6.1 to 7.8

Bk horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 3, 4, or 6

Texture: Loam or clay loam

Clay content: 18 to 30 percent

Content of rock fragments: 40 to 80 percent—20 to 35 percent cobbles; 20 to 45 percent pebbles

Calcium carbonate equivalent: 15 to 30 percent

Reaction: pH 7.4 to 8.4

84D—Helmville cobbly loam, cool, 8 to 15 percent slopes

Setting

Landform: Mountains

Position on landform: Foothills and toeslopes

Slope: 8 to 15 percent

Elevation: 4,600 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Helmville and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Relyea and similar soils: 0 to 5 percent

Whitore and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

84E—Helmville cobbly loam, cool, 15 to 35 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and foothills

Slope: 15 to 35 percent

Elevation: 4,600 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Helmville and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Relyea and similar soils: 0 to 5 percent

Whitore and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

84F—Helmville cobbly loam, cool, 35 to 60 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and shoulders

Slope: 35 to 60 percent

Elevation: 4,600 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Helmville and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Whitore and similar soils: 0 to 5 percent

Relyea and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

284E—Helmville cobbly loam, 15 to 35 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 4,600 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Helmville and similar soils: 85 percent

Minor Components

Relyea and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Worock and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

284F—Helmville cobbly loam, 35 to 60 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and shoulders

Slope: 35 to 60 percent

Elevation: 4,600 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Helmville and similar soils: 85 percent

Minor Components

Relyea and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Worock and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

384D—Helmville-Worock complex, 8 to 15 percent slopes

Setting

Landform:

- Helmville—Mountains
- Worock—Mountains

Position on landform:

- Helmville—Footslopes and toeslopes
- Worock—Footslopes and toeslopes

Slope:

- Helmville—8 to 15 percent
- Worock—8 to 15 percent

Elevation: 4,600 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Helmville and similar soils: 45 percent

Worock and similar soils: 40 percent

Minor Components

Whitore and similar soils: 0 to 5 percent

Maciver and similar soils: 0 to 5 percent

Relyea and similar soils: 0 to 5 percent

Major Component Description

Helmville

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.5 inches

Worock

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

384E—Helmville-Worock complex, 15 to 35 percent slopes

Setting

Landform:

- Helmville—Mountains
- Worock—Mountains

Position on landform:

- Helmville—Backslopes and footslopes
- Worock—Backslopes and footslopes

Slope:

- Helmville—15 to 35 percent
- Worock—15 to 35 percent

Elevation: 4,600 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Helmville and similar soils: 45 percent

Worock and similar soils: 40 percent

Minor Components

Maciver and similar soils: 0 to 5 percent

Relyea and similar soils: 0 to 5 percent

Whitore and similar soils: 0 to 5 percent

Major Component Description

Helmville

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.5 inches

Worock

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Holloway Series

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Permeability: Moderately rapid

Landform: Mountains

Parent material: Colluvium derived from argillite or quartzite

Slope range: 15 to 60 percent

Elevation range: 5,800 to 7,000 feet

Annual precipitation: 30 to 40 inches

Annual air temperature: 35 to 38 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Andic Eutrocrypts

Typical Pedon

Holloway gravelly silt loam, 15 to 35 percent slopes, in an area of woodland, 2,100 feet north and 300 feet east of the southwest corner of sec. 31, T. 5 N., R. 15 W.

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

A—0 to 9 inches; light yellowish brown (10YR 6/4) gravelly silt loam; dark yellowish brown (10YR 4/4) moist; moderate fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine, fine, medium, and coarse roots; common very fine and fine irregular pores; 5 percent cobbles and 25 percent pebbles; moderately acid; clear wavy boundary.

2E—9 to 23 inches; pinkish gray (7.5YR 6/2) extremely gravelly sandy loam, brown (7.5YR 5/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; many very fine, fine, medium, and coarse roots; common very fine and fine irregular pores; 10 percent cobbles and 55 percent pebbles; moderately acid; clear smooth boundary.

2E and Bt—23 to 47 inches; E part (75 percent) pinkish gray (7.5YR 6/2) extremely gravelly sandy loam, brown (7.5YR 5/2) moist; B part (25 percent) is brown (7.5YR 5/2) fine sandy loam lamellae $\frac{1}{8}$ - to $\frac{1}{2}$ -inch thick, dark brown (7.5YR 4/4) moist; moderate fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; few very fine and fine roots; common very fine irregular pores; 10 percent cobbles and 55 percent pebbles; moderately acid; gradual wavy boundary.

2C—47 to 60 inches; pale brown (10YR 6/3) extremely gravelly sandy loam, grayish brown (10YR 5/2) moist; massive; soft, very friable, nonsticky, nonplastic; many very fine roots; few very fine and fine irregular pores; 15 percent cobbles and 55 percent pebbles; moderately acid.

Range in Characteristics

Soil temperature: 39 to 44 degrees F

Moisture control section: Between 8 and 24 inches

A horizon

Hue: 10YR or 7.5YR

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 4 or 6

Clay content: 5 to 15 percent

Content of rock fragments: 10 to 35 percent—0 to 10 percent cobbles; 10 to 30 percent pebbles
Reaction: 5.1 to 6.5

2E horizon

Hue: 10YR or 7.5YR
Value: 6 or 7 dry; 5 or 6 moist
Chroma: 2 or 3
Texture: Loam, sandy loam, or fine sandy loam
Clay content: 5 to 15 percent
Content of rock fragments: 45 to 75 percent—0 to 15 percent cobbles; 45 to 60 percent pebbles
Reaction: 5.1 to 6.5

2E and Bt horizon

Hue: E part—10YR or 7.5YR; B part—10YR or 7.5YR
Value: E part—6 or 7 dry, 5 or 6 moist; B part—5 or 6 dry, 4 or 5 moist
Chroma: E part—2 or 3; B part—2 to 4
Texture: Sandy loam or fine sandy loam
Clay content: 5 to 15 percent—lamellae has less than 3 percent clay increase
Content of rock fragments: 60 to 80 percent—5 to 15 percent cobbles; 55 to 70 percent pebbles
Reaction: 5.1 to 6.5

2C horizon

Hue: 10YR or 7.5YR
Value: 6 or 7 dry; 5 or 6 moist
Chroma: 2 to 4
Texture: Fine sandy loam, sandy loam, or loamy sand
Clay content: 5 to 15 percent
Content of rock fragments: 60 to 80 percent—5 to 20 percent cobbles; 55 to 70 percent pebbles
Reaction: 5.1 to 6.5

**81E—Holloway gravelly silt loam,
15 to 35 percent slopes**

Setting

Landform: Mountains
Position on landform: Summits of mountains
Slope: 15 to 35 percent
Elevation: 5,800 to 7,000 feet
Mean annual precipitation: 30 to 40 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Holloway and similar soils: 85 percent

Minor Components

Elve and similar soils: 0 to 5 percent
Evaro and similar soils: 0 to 5 percent
Rumsey and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly silt loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

**81F—Holloway gravelly silt loam,
35 to 60 percent slopes**

Setting

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent
Elevation: 5,800 to 7,000 feet
Mean annual precipitation: 30 to 40 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Holloway and similar soils: 85 percent

Minor Components

Elve and similar soils: 0 to 5 percent
Evaro and similar soils: 0 to 5 percent
Rumsey and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly silt loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Judell Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Alluvial fans and stream terraces

Parent material: Alluvium derived from limestone

Slope range: 2 to 4 percent

Elevation range: 3,600 to 5,400 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Fine-loamy, carbonatic, frigid
Typic Calciustolls

Typical Pedon

Judell loam, 2 to 4 percent slopes, in an area of rangeland, 1,600 feet south and 200 feet east of the northwest corner of sec. 11, T. 9 N., R. 13 W.

A—0 to 7 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine and common medium roots; many fine and very fine irregular pores; 10 percent pebbles; strongly effervescent; slightly alkaline; clear smooth boundary.

Bk1—7 to 16 inches; very pale brown (10YR 7/3) loam, pale brown (10YR 6/3) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine and few very fine and medium roots; many fine and very fine irregular pores; 10 percent pebbles; common medium masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

Bk2—16 to 25 inches; very pale brown (10YR 8/3) loam, very pale brown (10YR 7/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine and few very fine roots; many very fine and fine irregular pores; 10 percent pebbles; common

medium masses of lime; violently effervescent; strongly alkaline; gradual smooth boundary.

Bk3—25 to 42 inches; very pale brown (10YR 8/3) gravelly loam; very pale brown (10YR 7/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; common fine and few very fine roots; common fine and very fine irregular pores; 15 percent pebbles, common fine masses of lime; violently effervescent; strongly alkaline; clear wavy boundary.

2C—42 to 60 inches; light yellowish brown (10YR 6/4) very gravelly loam; yellowish brown (10YR 5/4) moist; massive; soft, very friable, slightly sticky, moderately plastic; few very fine and fine roots; common fine and few very fine irregular pores; 35 percent pebbles, 10 percent cobbles; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 10 inches

Depth to the Bk horizon: 6 to 10 inches

Depth to the 2C horizon: 40 to 60 inches

A horizon

Hue: 7.5YR to 2.5Y

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 20 to 27 percent

Content of rock fragments: 0 to 15 percent
pebbles

Calcium carbonate equivalent: 0 to 5 percent

Reaction: pH 7.4 to 8.4

Bk1 horizon

Hue: 7.5YR to 2.5Y

Value: 6 or 7 dry; 4 to 6 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

Calcium carbonate equivalent: 15 to 35 percent

Reaction: pH 7.9 to 8.4

Bk2 and Bk3 horizons

Hue: 7.5YR to 2.5Y

Value: 6 to 8 dry; 5 to 7 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 20 to 35 percent

Content of rock fragments: 0 to 15 percent
pebbles

Calcium carbonate equivalent: 40 to 60 percent
Reaction: pH 7.9 to 9.0

2C horizon

Hue: 7.5YR to 2.5Y
Value: 6 to 8 dry; 5 to 7 moist
Chroma: 2 to 4
Texture: Loam or clay loam
Clay content: 12 to 35 percent
Content of rock fragments: 35 to 75 percent—0 to 10 percent cobbles; 35 to 65 percent pebbles
Calcium carbonate equivalent: 30 to 40 percent
Reaction: pH 7.9 to 8.4

61B—Judell loam, 2 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 2 to 4 percent
Elevation: 3,600 to 5,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Judell and similar soils: 85 percent

Minor Components

Shawmut and similar soils: 0 to 5 percent
Quigley and similar soils: 0 to 5 percent
Fairfield and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Julius Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Slow
Landform: Alluvial fans
Parent material: Alluvium or residuum
Slope range: 2 to 15 percent
Elevation range: 3,600 to 6,200 feet
Annual precipitation: 15 to 19 inches
Annual air temperature: 39 to 44 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Fine, mixed, superactive, frigid
Alfic Argiustolls

Typical Pedon

Julius loam, 4 to 8 percent slopes, in an area of hayland, 1,800 feet south and 2,800 feet west of the northeast corner of sec. 34, T. 6 N., R. 14 W.

Ap1—0 to 4 inches; dark gray (10YR 4/1) loam, black (10YR 2/1) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many fine roots; many very fine tubular pores; neutral; clear wavy boundary.

Ap2—4 to 8 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many fine and medium roots; many very fine pores; neutral; clear wavy boundary.

Bt/E—8 to 11 inches; B part (65 percent) is brown (7.5YR 5/4) clay loam, dark brown (10YR 4/4) moist; E part (35 percent) is pinkish gray (7.5YR 6/2) loam, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure; soft, friable, slightly sticky, slightly plastic; many fine and medium roots; common fine tubular pores; slightly alkaline; abrupt smooth boundary.

Bt1—11 to 17 inches; brown (7.5YR 5/4) clay, dark brown (7.5YR 4/4) moist; strong medium columnar structure; very hard, very firm, very sticky, very plastic; common fine and medium roots; few very fine tubular pores; many distinct clay films on faces of peds; strongly alkaline; clear wavy boundary.

Bt2—17 to 23 inches; brown (7.5YR 5/4) clay loam, dark brown (7.5YR 4/4) moist; moderate medium prismatic structure; hard, firm, moderately sticky,

moderately plastic; common fine and medium and many very fine roots; common very fine tubular pores; common faint clay films on faces of peds; slightly alkaline; abrupt wavy boundary.

Bk—23 to 33 inches; very pale brown (10YR 8/3) loam, pale brown (10YR 6/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few fine and very fine roots; common fine tubular pores; disseminated lime, common fine masses of lime; violently effervescent; moderately alkaline; clear wavy boundary.

Cr—33 to 60 inches; very pale brown (10YR 8/4) semiconsolidated tuff.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 12 inches

Depth to the calcic horizon: 19 to 32 inches

Depth to the Cr horizon: 20 to 40 inches

Ap horizons

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 18 to 25 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles

Reaction: pH 6.6 to 7.3

Bt/E horizon

Hue: 10YR or 7.5YR

Value: B part—4 or 5 dry, 3 or 4 moist; E part—5 or 6 dry, 3 to 5 moist

Chroma: 2 to 4

Texture: Loam or clay loam (mixed)

Clay content: 18 to 30 percent

Content of rock fragments: 0 to 15 percent—0 to 10 percent cobbles; 0 to 5 percent pebbles

Reaction: pH 6.6 to 7.8

Bt1 horizon

Hue: 10YR or 7.5YR

Value: 5 or 6 dry, 4 or 5 moist

Chroma: 2 to 4

Texture: Clay or clay loam

Clay content: 35 to 50 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles

Reaction: pH 7.9 to 9.0

Bt2 horizon

Hue: 10YR or 7.5YR

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 3 or 4

Texture: Clay or clay loam

Clay content: 35 to 50 percent

Content of rock fragments: 0 to 5 percent pebbles

Reaction: pH 7.4 to 8.4

Bk horizon

Value: 6 to 8 dry; 5 or 6 moist

Chroma: 3 or 4

Texture: Clay loam or loam

Clay content: 15 to 30 percent

Content of rock fragments: 0 to 5 percent pebbles

Calcium carbonate equivalent: 15 to 30 percent

Reaction: pH 7.9 to 9.0

27B—Julius loam, 2 to 4 percent slopes

Setting

Landform: Alluvial fans

Position on landform: Toeslopes

Slope: 2 to 4 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Julius and similar soils: 85 percent

Minor Components

Donald and similar soils: 0 to 5 percent

Danvers and similar soils: 0 to 5 percent

Bandy and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Alluvium or residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

27C—Julius loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Julius and similar soils: 85 percent

Minor Components

Donald and similar soils: 0 to 5 percent
 Danvers and similar soils: 0 to 5 percent
 Bandy and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

27D—Julius loam, 8 to 15 percent slopes

Setting

Landform: Alluvial fans
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Julius and similar soils: 85 percent

Minor Components

Donald and similar soils: 0 to 5 percent
 Danvers and similar soils: 0 to 5 percent
 Bandy and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Kleinschmidt Series

Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Permeability: Moderate
Landform: Alluvial fans and stream terraces
Parent material: Alluvium
Slope range: 0 to 4 percent
Elevation range: 3,800 to 5,800 feet
Annual precipitation: 10 to 19 inches
Annual air temperature: 39 to 44 degrees F
Frost-free period: 70 to 105 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Oxyaquic Haplustolls

Typical Pedon

Kleinschmidt loam, 0 to 4 percent slopes, in an area of pasture, 2,750 feet south and 600 feet west of the northeast corner of sec. 29, T. 10 N., R. 13 W.

A—0 to 8 inches; very dark gray (10YR 3/1) loam, black (10YR 2/1) moist; strong medium granular structure; slightly hard, friable, moderately sticky, slightly plastic; many very fine and fine roots; many very fine and fine irregular pores; neutral; clear smooth boundary.
 Bw1—8 to 22 inches; grayish brown (10YR 5/2) silty clay loam, dark grayish brown (10YR 4/2) moist;

moderate fine subangular blocky structure; slightly hard, friable, moderately sticky, moderately plastic; many very fine and fine roots; many very fine and fine irregular pores; 10 percent pebbles; neutral; clear wavy boundary.

Bw2—22 to 33 inches; pale brown (10YR 6/3) very cobbly sandy loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, friable, moderately sticky, slightly plastic; common very fine and fine roots; many very fine and fine irregular pores; 20 percent cobbles and 30 percent pebbles; neutral; gradual smooth boundary.

2Bk—33 to 60 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 5/3) moist; few fine distinct brownish yellow (10YR 6/8) and yellowish brown (10YR 5/8) moist redox concentrations; single grain; loose, slightly sticky, slightly plastic; few very fine and fine roots; many very fine and fine irregular pores; 25 percent cobbles and 25 percent pebbles; few faint lime casts on undersides of coarse fragments; slightly alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

Depth to the seasonal high water table: 24 to 42 inches

Depth to the 2Bk horizon: 30 to 48 inches

A horizon

Value: 2 or 3 moist; 3 to 5 dry

Chroma: 1 or 2

Clay content: 15 to 25 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

Bw1 horizon

Value: 2 to 5 moist; 4 to 6 dry

Chroma: 2 to 4

Texture: Sandy loam, loam, or silty 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

Bw2 horizon

Value: 4 or 5 moist; 5 to 7 dry

Chroma: 2 to 4

Texture: Sandy loam or loam

Clay content: 18 to 27 percent

Content of rock fragments: 35 to 60 percent—5 to 20 percent cobbles; 30 to 40 percent pebbles
Reaction: pH 6.6 to 8.4

2Bk horizon

Hue: 10YR or 7.5YR

Value: 3 to 5 moist; 5 to 7 dry

Chroma: 1 to 6

Texture: Sandy loam, loamy sand, or sand

Clay content: 5 to 10 percent

Content of rock fragments: 40 to 70 percent—15 to 25 percent cobbles; 25 to 45 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4

447B—Kleinschmidt gravelly loam, cool, 0 to 4 percent slopes, rarely flooded

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 3,800 to 5,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Kleinschmidt and similar soils: 85 percent

Minor Components

Modesty and similar soils: 0 to 3 percent

Gregson and similar soils: 0 to 3 percent

Mannixlee and similar soils: 0 to 3 percent

Perma and similar soils: 0 to 3 percent

Windlass and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Apparent

Available water capacity: Mainly 4.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

547B—Kleinschmidt gravelly loam, cool, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 3,800 to 5,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 105 days

Composition

Major Components

Kleinschmidt and similar soils: 85 percent

Minor Components

Modesty and similar soils: 0 to 3 percent

Gregson and similar soils: 0 to 3 percent

Mannixlee and similar soils: 0 to 3 percent

Perma and similar soils: 0 to 3 percent

Windlass and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Apparent

Available water capacity: Mainly 4.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

557B—Kleinschmidt gravelly loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 3,800 to 5,800 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 70 to 105 days

Composition

Major Components

Kleinschmidt and similar soils: 85 percent

Minor Components

Modesty and similar soils: 0 to 3 percent

Gregson and similar soils: 0 to 3 percent

Mannixlee and similar soils: 0 to 3 percent

Perma and similar soils: 0 to 3 percent

Windlass and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Apparent

Available water capacity: Mainly 4.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

847B—Kleinschmidt loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 3,800 to 5,800 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 70 to 105 days

Composition

Major Components

Kleinschmidt and similar soils: 85 percent

Minor Components

Modesty and similar soils: 0 to 3 percent

Gregson and similar soils: 0 to 3 percent

Mannixlee and similar soils: 0 to 3 percent

Perma and similar soils: 0 to 3 percent

Windlass and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Apparent
Available water capacity: Mainly 5.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

947B—Kleinschmidt cobbly loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Treads
Slope: 0 to 4 percent
Elevation: 3,800 to 5,800 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 70 to 105 days

Composition

Major Components

Kleinschmidt and similar soils: 85 percent

Minor Components

Gregson and similar soils: 0 to 3 percent
 Perma and similar soils: 0 to 3 percent
 Windlass and similar soils: 0 to 3 percent
 Modesty and similar soils: 0 to 3 percent
 Mannixlee and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Apparent
Available water capacity: Mainly 4.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Krutar Series

Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Permeability: Moderate above the sandy-skeletal material; rapid in the sandy-skeletal material
Landform: Stream terraces
Parent material: Alluvium
Slope range: 2 to 4 percent
Elevation range: 3,600 to 5,700 feet
Annual precipitation: 15 to 19 inches
Annual air temperature: 39 to 44 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal over sandy or sandy-skeletal, mixed, superactive, frigid Typic Calciustolls

Typical Pedon

Krutar loam, 2 to 4 percent slopes, in an area of irrigated grass pasture, 3,600 feet south and 1,320 feet west of the northeast corner of sec. 22, T. 5 N., R. 15 W.

- A—0 to 8 inches; grayish brown (10YR 5/2) loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine pores; 5 percent pebbles; disseminated lime; slightly effervescent; slightly alkaline; clear smooth boundary.
- Bw—8 to 13 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; few medium and common very fine tubular pores; 5 percent cobbles and 15 percent pebbles; disseminated lime; continuous distinct lime coatings on undersides of rock fragments; violently effervescent; moderately alkaline; clear smooth boundary.
- Bk—13 to 21 inches; light gray (10YR 7/2) very gravelly loam, grayish brown (10YR 5/2) moist; weak medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; common very fine tubular pores; 25 percent pebbles and 15 percent cobbles; disseminated lime; continuous distinct lime casts on rock fragments; violently

effervescent; moderately alkaline; clear wavy boundary.

2C—21 to 60 inches; light brownish gray (10YR 6/2) very cobbly loamy sand, grayish brown (10YR 5/2) moist; single grain; loose, nonsticky, nonplastic; few fine roots; 25 percent pebbles, 30 percent cobbles; disseminated lime; continuous distinct lime coatings on sides of rock fragments and continuous prominent lime casts on undersides of rock fragments; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 10 inches

Depth to the sandy-skeletal 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 27 percent

Content of rock fragments: 0 to 35 percent—0 to 25 percent cobbles; 0 to 10 percent pebbles

Reaction: pH 6.6 to 7.8

Bw horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 4 or 5 moist

Chroma: 2 or 3

Clay content: 18 to 27 percent

Content of rock fragments: 15 to 35 percent—0 to 5 percent stones; 5 to 15 percent cobbles; 10 to 15 percent pebbles

Electrical conductivity: 2 to 4 mmhos/cm

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4

Bk horizon

Hue: 10YR or 2.5Y

Value: 7 or 8 dry; 5 or 6 moist

Chroma: 2 or 3

Texture: Loam or sandy loam

Clay content: 18 to 25 percent

Content of rock fragments: 35 to 60 percent—0 to 5 percent stones; 15 to 25 percent cobbles; 20 to 30 percent pebbles

Electrical conductivity: 2 to 4 mmhos/cm

Calcium carbonate equivalent: 15 to 30 percent

Reaction: pH 7.9 to 8.4

2C horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 4 to 6 moist

Chroma: 2 or 3

Texture: Loamy sand or sand

Clay content: 0 to 10 percent

Content of rock fragments: 55 to 80 percent—5 to 10 percent stones; 20 to 30 percent cobbles; 25 to 40 percent pebbles

Electrical conductivity: 2 to 4 mmhos/cm

Calcium carbonate equivalent: 15 to 20 percent

Reaction: pH 7.9 to 8.4

23B—Krutar loam, 2 to 4 percent slopes

Setting

Landform: Stream terraces

Position on landform: Treads

Slope: 2 to 4 percent

Elevation: 3,600 to 5,700 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Krutar and similar soils: 85 percent

Minor Components

Dominic and similar soils: 0 to 5 percent

Sarbo and similar soils: 0 to 5 percent

Bandy and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

123B—Krutar cobbly loam, 2 to 4 percent slopes

Setting

Landform: Stream terraces

Position on landform: Treads

Slope: 2 to 4 percent

Elevation: 3,600 to 5,700 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Krutar and similar soils: 85 percent

Minor Components

Perma and similar soils: 0 to 10 percent
 Slopes more than 4 percent: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Lap Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Moderate
Landform: Mountains and hills
Parent material: Material derived from limestone
Slope range: 8 to 60 percent
Elevation range: 3,600 to 6,000 feet
Annual precipitation: 10 to 19 inches
Annual air temperature: 39 to 44 degrees F
Frost-free period: 70 to 105 days

Taxonomic Class: Loamy-skeletal, carbonatic, frigid
 Lithic Calcicustolls

Typical Pedon

Lap loam, in an area of Windham-Lap-Rock outcrop complex, 15 to 35 percent slopes, in an area of rangeland, 2,300 feet south and 600 feet east of the northwest corner of sec. 26, T. 11 N., R. 13 W.

A—0 to 8 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very

fine and fine roots; few fine and very fine pores; 10 percent pebbles; slightly effervescent; slightly alkaline; clear smooth boundary.

Bk—8 to 16 inches; light gray (10YR 7/2) very gravelly loam, grayish brown (10YR 5/2) moist; weak fine subangular blocky structure; soft, friable, slightly sticky, slightly plastic; many very fine and fine roots; few fine and very fine pores; 15 percent cobbles and 35 percent pebbles; disseminated lime, common distinct lime casts on underside of coarse fragments; violently effervescent; moderately alkaline.

R—16 inches; limestone bedrock.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: Between 4 and 12 inches
Thickness of the mollic epipedon: 7 to 10 inches
Depth to bedrock: 10 to 20 inches
Depth to the calcic horizon: 7 to 10 inches

A 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
 Content of rock fragments: 10 to 35 percent—0 to 15 percent stones and cobbles; 10 to 20 percent pebbles
 Calcium carbonate equivalent: 0 to 15 percent
 Reaction: pH 6.6 to 7.8

Bk horizon

Hue: 7.5YR to 2.5Y
 Value: 6 to 8 dry; 5 or 6 moist
 Chroma: 2 or 3
 Clay content: 20 to 27 percent
 Content of rock fragments: 35 to 65 percent—15 to 30 percent stones and cobbles; 30 to 40 percent pebbles
 Calcium carbonate equivalent: 40 to 60 percent
 Reaction: pH 7.9 to 8.4

Levengood Series

Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Permeability: Moderate
Landform: Mountains
Parent material: Material derived from calcareous shale
Slope range: 4 to 60 percent
Elevation range: 5,800 to 7,000 feet
Annual precipitation: 15 to 22 inches

Annual air temperature: 34 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Calcic Pachic Haplocryolls

Typical Pedon

Levengood gravelly loam, in an area of Tibson-Levengood gravelly loams, 15 to 35 percent slopes, in an area of rangeland, 400 feet south and 2,100 feet east of the northwest corner of sec. 19, T. 6 N., R. 14 W.

A—0 to 6 inches; very dark grayish brown (10YR 3/2) gravelly loam, black (10YR 2/1) moist; weak fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; common fine interstitial pores; 5 percent cobbles, 20 percent pebbles; neutral; clear smooth boundary.

Bw—6 to 12 inches; brown (10YR 5/3) very gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine tubular pores; 5 percent cobbles, 30 percent pebbles; neutral; clear smooth boundary.

Bk1—12 to 19 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine and fine pores; 10 percent cobbles, 35 percent pebbles; disseminated lime, few fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk2—19 to 30 inches; pale yellow (2.5Y 7/4) very gravelly fine sandy loam, light yellowish brown (2.5Y 6/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine and fine roots; 10 percent cobbles, 35 percent pebbles; disseminated lime, few fine masses of lime; violently effervescent; moderately alkaline; gradual smooth boundary.

Bk3—30 to 60 inches; very pale brown (10YR 7/4) very cobbly loam, light yellowish brown (10YR 6/4) moist; weak coarse prismatic structure; soft, very friable nonsticky, nonplastic; few very fine roots; 25 percent cobbles; 20 percent pebbles; disseminated lime, few fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 16 to 30 inches

Depth to the calcic horizon: 12 to 18 inches

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: 15 to 30 percent—0 to 5 percent cobbles; 15 to 25 percent pebbles

Reaction: pH 6.6 to 7.3

Bw horizon

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 to 3

Texture: Clay loam or loam

Clay content: 18 to 30 percent

Content of rock fragments: 35 to 55 percent—5 to 15 percent cobbles; 30 to 40 percent pebbles

Reaction: pH 6.6 to 7.3

Bk1 horizon

Value: 4 or 5 dry; 3 or 4 moist

Chroma: 1 to 3

Texture: Clay loam or loam

Clay content: 18 to 30 percent

Content of rock fragments: 35 to 50 percent—5 to 10 percent cobbles; 30 to 40 percent pebbles

Calcium carbonate equivalent: 15 to 40 percent

Reaction: pH 7.9 to 8.4

Bk2 horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 5 or 6 moist

Chroma: 3 or 4

Texture: Clay loam, loam, or fine sandy loam

Clay content: 18 to 30 percent

Content of rock fragments: 35 to 50 percent—5 to 10 percent cobbles; 30 to 40 percent pebbles

Calcium carbonate equivalent: 15 to 40 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: 3 or 4

Texture: Clay loam, loam, or sandy loam

Clay content: 15 to 30 percent

Content of rock fragments: 35 to 60 percent—15 to 30 percent cobbles; 20 to 30 percent pebbles

Calcium carbonate equivalent: 15 to 40 percent

Reaction: pH 7.9 to 8.4

Libeg Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Mountains

Parent material: Colluvium from argillite

Slope range: 2 to 60 percent

Elevation range: 5,200 to 7,000 feet

Annual precipitation: 15 to 22 inches

Annual air temperature: 34 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Ustic Argicryolls

Typical Pedon

Libeg channery loam, 15 to 35 percent slopes, in an area of rangeland, 2,050 feet north and 150 feet east of the southwest corner of sec. 14, T. 7 N., R. 15 W.

A—0 to 7 inches; grayish brown (10YR 5/2) channery loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky, moderately plastic; many very fine and fine roots; common very fine tubular pores; 20 percent channers; neutral; clear smooth boundary.

Bt1—7 to 12 inches; brown (10YR 5/3) channery loam, dark brown (10YR 3/3) moist; moderate fine and very fine subangular blocky structure; slightly hard, very friable, moderately sticky, moderately plastic; many very fine and fine roots; common very fine tubular pores; few faint clay films on faces of pedis; 35 percent channers; neutral; clear smooth boundary.

Bt2—12 to 19 inches; brown (10YR 5/3) very channery clay loam; dark yellowish brown (10YR 3/4) moist; moderate fine and very fine subangular blocky structure; hard, friable, moderately sticky, moderately plastic; many very fine roots; common very fine tubular pores; common faint clay films on faces of pedis; 40 percent channers; neutral; clear smooth boundary.

Bt3—19 to 44 inches; light brown (7.5YR 6/4) extremely channery clay loam; dark brown (7.5YR 4/4) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; common fine and very fine roots; few very fine irregular pores; few faint clay films on faces of pedis; 70 percent channers; neutral; gradual wavy boundary.

BC—44 to 60 inches; pinkish gray (7.5YR 6/2) very channery loam; dark brown (7.5YR 4/2) moist;

weak fine subangular blocky structure; hard, firm, slightly sticky, moderately plastic; common fine and very fine roots; few very fine irregular pores; 55 percent channers; neutral.

Range in Characteristics

Soil temperature: 36 to 44 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 10 to 16 inches

A horizon

Hue: 10YR or 7.5YR

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 18 to 27 percent

Content of rock fragments: 15 to 35 percent channers

Reaction: pH 6.1 to 7.3

Bt horizons

Hue: 5YR to 10YR

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 6

Texture: Loam or clay loam

Clay content: 15 to 35 percent

Content of rock fragments: 35 to 70 percent channers

Reaction: pH 5.6 to 7.3

BC horizon

Hue: 5YR to 10YR

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 to 6

Texture: Loam or sandy loam

Clay content: 10 to 20 percent

Content of rock fragments: 40 to 70 percent channers

Reaction: pH 5.6 to 7.3

54B—Libeg channery loam, 2 to 4 percent slopes**Setting**

Landform: Mountains

Position on landform: Toeslopes

Slope: 2 to 4 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition**Major Components**

Libeg and similar soils: 85 percent

Minor Components

Finn and similar soils: 0 to 5 percent
 Copenhagen and similar soils: 0 to 5 percent
 Mollet and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Channery loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Argillite colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

54C—Libeg channery loam, 4 to 8 percent slopes**Setting**

Landform: Mountains
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 5,800 to 7,000 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Composition**Major Components**

Libeg and similar soils: 85 percent

Minor Components

Finn and similar soils: 0 to 5 percent
 Copenhagen and similar soils: 0 to 5 percent
 Mollet and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Channery loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Argillite colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

54D—Libeg channery loam, 8 to 15 percent slopes**Setting**

Landform: Mountains
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 5,800 to 7,000 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Composition**Major Components**

Libeg and similar soils: 85 percent

Minor Components

Copenhagen and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent
 Mollet and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Channery loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Argillite colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

54E—Libeg channery loam, 15 to 35 percent slopes**Setting**

Landform: Mountains
Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent
Elevation: 5,800 to 7,000 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Libeg and similar soils: 85 percent

Minor Components

Copenhaver and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent
 Mollet and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Channery loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Argillite colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

54F—Libeg channery loam, 35 to 60 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent
Elevation: 5,800 to 7,000 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Libeg and similar soils: 85 percent

Minor Components

Copenhaver and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent
 Redchief and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Channery loam
Depth class: Very deep (more than 60 inches)

Drainage class: Well drained
Dominant parent material: Argillite colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

130D—Libeg-Copenhaver-Rock outcrop complex, 8 to 15 percent slopes

Setting

Landform:

- Libeg—Mountains
- Copenhaver—Mountains
- Rock outcrop—Mountains

Position on landform:

- Libeg—Foothills and toeslopes
- Copenhaver—Foothills and toeslopes
- Rock outcrop—Foothills and toeslopes

Slope:

- Libeg—8 to 15 percent
- Copenhaver—8 to 15 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Libeg and similar soils: 40 percent
 Copenhaver and similar soils: 30 percent
 Rock outcrop: 15 percent

Minor Components

Redchief and similar soils: 0 to 5 percent
 Maciver and similar soils: 0 to 5 percent
 Levengood and similar soils: 0 to 5 percent

Major Component Description

Libeg

Surface layer texture: Channery loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Argillite colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.6 inches

Copenhaver*Surface layer texture:* Gravelly loam*Depth class:* Shallow (10 to 20 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from extrusive igneous rocks*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 1.3 inches**Rock outcrop***Definition:* Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

130E—Libeg-Copenhaver-Rock outcrop complex, 15 to 35 percent slopes**Setting***Landform:*

- Libeg—Mountains
- Copenhaver—Mountains
- Rock outcrop—Mountains

Position on landform:

- Libeg—Backslopes and footslopes
- Copenhaver—Backslopes and footslopes
- Rock outcrop—Backslopes and footslopes

Slope:

- Libeg—15 to 35 percent
- Copenhaver—15 to 35 percent

Elevation: 5,800 to 7,000 feet*Mean annual precipitation:* 15 to 22 inches*Frost-free period:* 30 to 70 days**Composition****Major Components**

Libeg and similar soils: 40 percent

Copenhaver and similar soils: 30 percent

Rock outcrop: 15 percent

Minor Components

Redchief and similar soils: 0 to 5 percent

Maciver and similar soils: 0 to 5 percent

Levengood and similar soils: 0 to 5 percent

Major Component Description**Libeg***Surface layer texture:* Channery loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Argillite colluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 4.6 inches**Copenhaver***Surface layer texture:* Gravelly loam*Depth class:* Shallow (10 to 20 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from extrusive igneous rocks*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 1.3 inches**Rock outcrop***Definition:* Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

130F—Libeg-Copenhaver-Rock outcrop complex, 35 to 60 percent slopes**Setting***Landform:*

- Libeg—Mountains
- Copenhaver—Mountains
- Rock outcrop—Mountains

Position on landform:

- Libeg—Backslopes and shoulders
- Copenhaver—Backslopes and shoulders
- Rock outcrop—Backslopes and shoulders

Slope:

- Libeg—35 to 60 percent
- Copenhaver—35 to 60 percent

Elevation: 5,800 to 7,000 feet*Mean annual precipitation:* 15 to 22 inches*Frost-free period:* 30 to 70 days

Composition

Major Components

Libeg and similar soils: 40 percent
Copenhaver and similar soils: 30 percent
Rock outcrop: 15 percent

Minor Components

Redchief and similar soils: 0 to 5 percent
Levengood and similar soils: 0 to 5 percent
Maciver and similar soils: 0 to 5 percent

Major Component Description

Libeg

Surface layer texture: Channery loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Argillite colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.6 inches

Copenhaver

Surface layer texture: Gravelly loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.3 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

916—Limestone quarry

Composition

Major Components

Limestone quarry: 100 percent

Major Component Description

Definition: Areas of an open or surface working used for the extraction of limestone.

Loberg Series

Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Permeability: Slow
Landform: Mountains
Parent material: Material from extrusive igneous rocks
Slope range: 4 to 60 percent
Elevation range: 5,800 to 7,500 feet
Annual precipitation: 20 to 30 inches
Annual air temperature: 35 to 38 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Clayey-skeletal, mixed, superactive Ustic Glossocryalfs

Typical Pedon

Loberg gravelly loam, in an area of Worock-Loberg complex, 15 to 35 percent slopes, in an area of woodland, 2,400 feet north and 1,100 feet west of the southeast corner of sec. 6, T. 7 N., R. 15 W.

Oe—2 inches to 0; partially decomposed forest litter.
E—0 to 8 inches; light brownish gray (10YR 6/2) gravelly loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine pores; 25 percent pebbles; moderately acid; clear wavy boundary.
Bt/E—8 to 16 inches; B part (85 percent) is yellowish brown (10YR 5/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; E part (15 percent) is light brownish gray (10YR 6/2) very gravelly loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; hard, friable, moderately sticky, moderately plastic; many very fine and fine roots; few very fine pores; common faint clay films on faces of peds; 5 percent cobbles and 30 percent pebbles; slightly acid; gradual wavy boundary.
Bt1—16 to 30 inches; yellowish brown (10YR 5/6) very gravelly clay, dark yellowish brown (10YR 4/6) moist; moderate fine subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; many very fine and fine roots; few very fine pores; common faint clay films on faces of peds; 10 percent cobbles and 30 percent pebbles; neutral; gradual wavy boundary.
Bt2—30 to 46 inches; yellowish brown (10YR 5/6) very gravelly clay loam, dark yellowish brown (10YR 4/6) moist; moderate fine subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; many very fine and

fine and few medium roots; few very fine pores; common faint clay films on faces of peds; 5 percent cobbles and 35 percent pebbles; neutral; gradual wavy boundary.

Bt3—46 to 60 inches; brownish yellow (10YR 6/6) very cobbly clay loam; yellowish brown (10YR 5/6) moist; moderate fine subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; common very fine and fine roots; common faint clay films on faces of peds; 20 percent cobbles and 25 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 36 to 47 degrees F

Moisture control section: Between 4 and 12 inches

E horizon

Hue: 7.5YR to 5Y

Value: 5 to 7 dry; 3 to 5 moist

Chroma: 2 or 3

Texture: Loam, clay loam, or sandy loam

Clay content: 20 to 35 percent

Content of rock fragments: 20 to 30 percent pebbles

Reaction: pH 5.1 to 6.5

Bt/E horizon

Hue: 7.5YR to 5Y

Value: B part—4 to 6 dry, 3 to 5 moist; E part—5 to 7 dry, 3 to 5 moist

Chroma: 2 or 3

Texture: Clay loam or loam

Clay content: 25 to 35 percent (mixed)

Content of rock fragments: 15 to 40 percent—0 to 10 percent stones and cobbles; 15 to 30 percent pebbles

Reaction: pH 5.1 to 6.5

Bt1 horizon

Hue: 7.5YR to 5Y

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 6

Texture: Clay loam or clay

Clay content: 35 to 50 percent

Content of rock fragments: 30 to 50 percent—0 to 5 percent stones; 10 to 15 percent cobbles; 20 to 30 percent pebbles

Reaction: pH 5.1 to 7.3

Bt2 horizon

Hue: 7.5YR to 5Y

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 6

Texture: Clay loam or clay

Clay content: 35 to 45 percent

Content of rock fragments: 35 to 55 percent—0 to 5 percent stones; 5 to 10 percent cobbles; 30 to 40 percent pebbles

Reaction: pH 6.1 to 7.8

Bt3 horizon

Hue: 7.5YR to 5Y

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 6

Texture: Clay loam or clay

Clay content: 35 to 45 percent

Content of rock fragments: 35 to 60 percent—0 to 5 percent stones; 20 to 30 percent cobbles; 15 to 25 percent pebbles

Reaction: pH 6.6 to 7.3

85D—Loberg gravelly loam, 4 to 15 percent slopes

Setting

Landform: Mountains

Position on landform: Footslopes and toeslopes

Slope: 4 to 15 percent

Elevation: 5,800 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Loberg and similar soils: 85 percent

Minor Components

Danaher and similar soils: 0 to 6 percent

Worock and similar soils: 0 to 6 percent

Foolhen and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

85E—Loberg gravelly loam, 15 to 35 percent slopes**Setting**

Landform: Mountains
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent
Elevation: 5,800 to 7,500 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Composition**Major Components**

Loberg and similar soils: 85 percent

Minor Components

Danaher and similar soils: 0 to 5 percent
 Worock and similar soils: 0 to 4 percent
 Areas of rock outcrop: 0 to 3 percent
 Foolhen and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

85F—Loberg gravelly loam, 35 to 60 percent slopes**Setting**

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent
Elevation: 5,800 to 7,500 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Composition**Major Components**

Loberg and similar soils: 85 percent

Minor Components

Danaher and similar soils: 0 to 5 percent
 Worock and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

585D—Loberg very cobbly sandy loam, 8 to 15 percent slopes**Setting**

Landform: Mountains
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 5,800 to 7,500 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Composition**Major Components**

Loberg and similar soils: 85 percent

Minor Components

Danaher and similar soils: 0 to 7 percent
 Worock and similar soils: 0 to 8 percent

Major Component Description

Surface layer texture: Very cobbly sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

585E—Loberg very cobbly sandy loam, 15 to 35 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 5,800 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Loberg and similar soils: 85 percent

Minor Components

Danaher and similar soils: 0 to 7 percent

Worock and similar soils: 0 to 8 percent

Major Component Description

Surface layer texture: Very cobbly sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Lone Rock Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Very rapid

Landform: Stream terraces and alluvial fans

Parent material: Alluvium

Slope range: 0 to 8 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Sandy-skeletal, mixed, frigid Typic Haplustolls

Typical Pedon

Lone Rock cobbly loam, 0 to 4 percent slopes, in an area of rangeland, 1,800 feet south and 2,400 feet west of the northeast corner of sec. 17, T. 5 N., R. 15 W.

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

Bw—7 to 11 inches; brown (10YR 4/3) very cobbly sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many fine and very fine roots; common very fine tubular pores; 15 percent cobbles and 25 percent pebbles; neutral; clear smooth boundary.

BC—11 to 18 inches; brown (10YR 5/3) very cobbly loamy sand, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky, nonplastic; many very fine and common fine roots; many very fine irregular pores; 20 percent cobbles and 30 percent pebbles; neutral; clear smooth boundary.

C—18 to 60 inches; brown (10YR 5/3) very cobbly sand; dark brown (10YR 4/3) moist; single grain; loose, nonsticky, nonplastic; few fine and very fine roots; many very fine irregular pores; 20 percent cobbles and 30 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 12 and 35 inches

Thickness of the mollic epipedon: 10 to 15 inches

A horizon

Hue: 10YR or 7.5YR

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 10 percent cobbles; 15 to 25 percent pebbles

Reaction: pH 6.1 to 7.3

Bw horizon

Hue: 10YR or 7.5YR
 Value: 4 or 5 dry; 3 or 4 moist
 Chroma: 2 or 3
 Texture: Loam or sandy loam
 Clay content: 10 to 15 percent
 Content of rock fragments: 35 to 50 percent—
 15 to 20 percent cobbles; 20 to 30 percent
 pebbles
 Reaction: pH 6.1 to 7.3

BC horizon

Hue: 10YR or 7.5YR
 Value: 5 to 7 dry; 4 to 6 moist
 Chroma: 2 to 4
 Texture: Loamy sand or sand
 Clay content: 0 to 10 percent
 Content of rock fragments: 40 to 75 percent—
 20 to 30 percent cobbles; 20 to 45 percent
 pebbles
 Reaction: pH 6.6 to 7.8

C horizon

Hue: 10YR or 7.5YR
 Value: 5 to 7 dry; 4 to 6 moist
 Chroma: 2 to 4
 Texture: Loamy sand or sand
 Clay content: 0 to 10 percent
 Content of rock fragments: 50 to 75 percent—
 20 to 30 percent cobbles; 30 to 45 percent
 pebbles
 Reaction: pH 6.6 to 7.8

18B—Lone Rock cobbly loam, 0 to 4 percent slopes

Setting

Landform: Stream terraces
Position on landform: Treads
Slope: 0 to 4 percent
Elevation: 3,600 to 5,500 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Lone Rock and similar soils: 85 percent

Minor Components

Lone Rock, greater slope: 0 to 5 percent
 Sarbo and similar soils: 0 to 5 percent
 Perma and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

18C—Lone Rock cobbly loam, 4 to 8 percent slopes

Setting

Landform: Stream terraces
Position on landform: Treads
Slope: 4 to 8 percent
Elevation: 3,600 to 5,500 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Lone Rock and similar soils: 85 percent

Minor Components

Sarbo and similar soils: 0 to 10 percent
 Perma and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

124B—Lone Rock-Sarbo complex, 2 to 4 percent slopes

Setting

Landform:

- Lone Rock—Alluvial fans and stream terraces
- Sarbo—Alluvial fans and stream terraces

Position on landform:

- Lone Rock—Treads
- Sarbo—Treads

Slope:

- Lone Rock—2 to 4 percent
- Sarbo—2 to 4 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Lone Rock and similar soils: 50 percent

Sarbo and similar soils: 35 percent

Minor Components

Perma and similar soils: 0 to 8 percent

Straw and similar soils: 0 to 7 percent

Major Component Description

Lone Rock

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.9 inches

Sarbo

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Maciver Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderately slow

Landform: Mountains

Parent material: Alluvium or colluvium derived from calcareous argillite

Slope range: 2 to 35 percent

Elevation range: 5,800 to 7,200 feet

Annual precipitation: 18 to 22 inches

Annual air temperature: 34 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Ustic Argicryolls

Typical Pedon

Maciver loam, 15 to 35 percent slopes, in an area of rangeland, 1,150 feet south and 2,150 feet east of the northwest corner of sec. 32, T. 5 N., R. 14 W.

A—0 to 7 inches; very dark gray (10YR 3/1) loam, black (10YR 2/1) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine and fine and few medium roots; few very fine and fine tubular pores; 10 percent pebbles; neutral; gradual wavy boundary.

Bt—7 to 11 inches; yellowish brown (10YR 5/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; hard, friable, moderately sticky, moderately plastic; many very fine and fine roots; few very fine and fine tubular pores; few faint clay films on faces of peds; 5 percent cobbles and 35 percent pebbles; neutral; clear smooth boundary.

Bk1—11 to 23 inches; pale yellow (2.5Y 7/4) very gravelly clay loam, light olive brown (2.5Y 5/4) moist; weak fine subangular blocky structure; hard, friable, slightly sticky, moderately plastic; many very fine and fine roots; few very fine and fine tubular pores; 5 percent cobbles and 35 percent pebbles; many medium masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—23 to 30 inches; light yellowish brown (2.5Y 6/4) very gravelly clay loam, light olive brown (2.5Y 5/4) moist; weak fine subangular blocky structure; hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; few very fine and fine tubular pores; 10 percent cobbles and 35 percent pebbles; many medium masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk3—30 to 60 inches; pale brown (10YR 6/3) very gravelly loam, yellowish brown (10YR 5/4) moist; weak coarse prismatic structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; few very fine and fine tubular pores; 15 percent cobbles and 40 percent pebbles; many medium masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

Depth to the Bk horizon: 11 to 24 inches

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: 0 to 15 percent—0 to 5 cobbles; 0 to 10 percent pebbles

Reaction: 6.6 to 7.3

Bt horizon

Value: 4 or 5 dry; 3 or 4 moist

Chroma: 2 to 4

Clay content: 27 to 35 percent

Content of rock fragments: 35 to 60 percent—0 to 10 percent cobbles; 35 to 50 percent pebbles

Reaction: 6.6 to 7.3

Bk horizons

Hue: 2.5Y or 10YR

Value: 6 to 8 dry; 5 or 6 moist

Chroma: 3 or 4

Texture: Loam, clay loam, or sandy clay loam

Clay content: 15 to 30 percent

Content of rock fragments: 40 to 60 percent—5 to 15 percent cobbles; 35 to 45 percent pebbles

Calcium carbonate equivalent: 15 to 35 percent

Reaction: 7.9 to 8.4

16B—Maciver loam, 2 to 4 percent slopes

Setting

Landform: Mountains

Position on landform: Toeslopes

Slope: 2 to 4 percent

Elevation: 5,800 to 7,200 feet

Mean annual precipitation: 18 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Maciver and similar soils: 85 percent

Minor Components

Libeg and similar soils: 0 to 5 percent

Levengood and similar soils: 0 to 5 percent

Tibson and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium or colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

16C—Maciver loam, 4 to 8 percent slopes

Setting

Landform: Mountains

Position on landform: Toeslopes

Slope: 4 to 8 percent

Elevation: 5,800 to 7,200 feet

Mean annual precipitation: 18 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Maciver and similar soils: 85 percent

Minor Components

Libeg and similar soils: 0 to 5 percent

Levengood and similar soils: 0 to 5 percent

Tibson and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium or colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

16D—Maciver loam, 8 to 15 percent slopes

Setting

Landform: Mountains

Position on landform: Footslopes and toeslopes

Slope: 8 to 15 percent

Elevation: 5,800 to 7,200 feet

Mean annual precipitation: 18 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Maciver and similar soils: 85 percent

Minor Components

Libeg and similar soils: 0 to 5 percent

Levengood and similar soils: 0 to 5 percent

Tibson and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium or colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

16E—Maciver loam, 15 to 35 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 5,800 to 7,200 feet

Mean annual precipitation: 18 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Maciver and similar soils: 85 percent

Minor Components

Libeg and similar soils: 0 to 5 percent

Levengood and similar soils: 0 to 5 percent

Tibson and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium or colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Mannixlee Series

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly drained

Permeability: Moderately slow

Landform: Stream terraces and flood plains

Parent material: Alluvium

Slope range: 0 to 4 percent

Elevation range: 3,800 to 5,600 feet

Annual precipitation: 10 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 105 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Cumulic Endoaquolls

Typical Pedon

Mannixlee clay loam, 0 to 2 percent slopes, in an area of pasture, 1,100 feet north and 300 feet east of the southwest corner of sec. 28, T. 10 N., R. 13 W.

Oi—2 inches to 0; partially decomposed organic matter.

A1—0 to 7 inches; very dark gray (10YR 3/1) clay loam, dark gray (10YR 4/1) dry; common medium distinct dark brown (7.5YR 4/4) redox concentrations; moderate medium granular structure; hard, friable, slightly sticky, slightly plastic; many fine and very fine roots; many very fine tubular and discontinuous irregular pores; neutral; gradual smooth boundary.

A2—7 to 14 inches; very dark gray (10YR 3/1) clay loam, dark gray (10YR 4/1) dry; moderate medium subangular blocky structure; very hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; common very fine tubular pores and many very fine discontinuous irregular pores; neutral; gradual smooth boundary.

A3—14 to 23 inches; very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) dry; common medium distinct dark brown (7.5YR 4/4) redox concentrations; moderate medium subangular blocky structure; very hard, friable, slightly sticky, slightly plastic; common fine and very fine roots; few fine tubular pores and few fine and very fine discontinuous irregular pores; neutral; gradual smooth boundary.

Bw—23 to 43 inches; very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) dry; many medium distinct dark brown (7.5YR 4/4) redox concentrations; weak medium subangular blocky structure; very hard, friable, slightly sticky, slightly plastic; few very fine and fine roots; few fine tubular pores and common very fine and fine discontinuous irregular pores; neutral; abrupt smooth boundary.

2Cg—43 to 60 inches; grayish brown (10YR 5/2) extremely cobbly loamy coarse sand, light brownish gray (10YR 6/2) dry; single grain; loose, nonsticky, nonplastic; 30 percent pebbles, 30 percent cobbles; neutral.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the seasonal high water table: 12 to 24 inches

Thickness of the mollic epipedon: 25 to 43 inches

Depth to the 2Cg horizon: 40 to 60 inches

A horizons

Value: 2 or 3 moist; 3 to 5 dry

Chroma: 1 or 2

Clay content: 18 to 35 percent

Reaction: pH 6.6 to 7.3

Bw horizon

Hue: 10YR to 5Y

Value: 2 or 3 moist; 3 to 5 dry

Chroma: 1 or 2

Texture: Loam, clay loam, silty clay loam, or silt loam

Clay content: 18 to 35 percent

Content of rock fragments: 0 to 30 percent—0 to 10 percent cobbles; 0 to 20 percent pebbles

Reaction: pH 6.6 to 7.3

2Cg horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 moist; 6 to 8 dry

Chroma: 1 to 3

Texture: Loamy coarse sand or coarse sand with thin layers of loam, sandy loam, silt loam, or clay loam

Clay content: 5 to 25 percent

Content of rock fragments: 15 to 70 percent—5 to 40 percent cobbles; 10 to 30 percent pebbles

Reaction: pH 6.6 to 7.3

645A—Mannixlee clay loam, 0 to 2 percent slopes

Setting

Landform: Stream terraces

Position on landform: Treads

Slope: 0 to 2 percent

Elevation: 3,800 to 5,600 feet

Mean annual precipitation: 10 to 19 inches

Frost-free period: 70 to 105 days

Composition

Major Components

Mannixlee and similar soils: 85 percent

Minor Components

Nythar and similar soils: 0 to 5 percent

Poronto and similar soils: 0 to 5 percent

Tetonview and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Apparent
Available water capacity: Mainly 8.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

855A—Mannixlee-Blossberg complex, 0 to 2 percent slopes, rarely flooded

Setting

Landform:

- Mannixlee—Flood plains
- Blossberg—Flood plains

Position on landform:

- Mannixlee—Treads
- Blossberg—Treads

Slope:

- Mannixlee—0 to 4 percent
- Blossberg—0 to 4 percent

Elevation: 3,800 to 5,600 feet

Mean annual precipitation: 10 to 19 inches

Frost-free period: 70 to 105 days

Composition

Major Components

Mannixlee and similar soils: 45 percent

Blossberg and similar soils: 40 percent

Minor Components

Bandy and similar soils: 0 to 4 percent

Poronto and similar soils: 0 to 4 percent

Nythar and similar soils: 0 to 4 percent

Gregson and similar soils: 0 to 3 percent

Major Component Description

Mannixlee

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Apparent

Available water capacity: Mainly 8.2 inches

Blossberg

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Apparent

Available water capacity: Mainly 5.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Marcott Series

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Slow

Landform: Stream terraces

Parent material: Alluvium

Slope range: 0 to 4 percent

Elevation range: 3,600 to 5,400 feet

Annual precipitation: 10 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 90 to 105 days

Taxonomic Class: Fine, smectitic, frigid Vertic Haplustolls

Typical Pedon

Marcott silty clay loam, 0 to 4 percent slopes, in an area of hayland, 1,700 feet south and 200 feet east of the northwest corner of sec. 27, T. 9 N., R. 13 W.

Az—0 to 8 inches; very dark gray (10YR 3/1) silty clay loam, black (10YR 2/1) moist; moderate fine subangular blocky structure parting to strong fine granular; very hard, very firm, slightly sticky, moderately plastic; many fine and very fine roots; many very fine and fine random interstitial pores; few medium seams of salt; neutral; clear smooth boundary.

Bz1—8 to 14 inches; light gray (10YR 7/1) silty clay loam, dark gray (10YR 4/1) moist; moderate fine subangular blocky structure; slightly hard, friable, moderately sticky, slightly plastic; few fine and very fine roots; many very fine and fine random interstitial pores; many medium seams of salt; neutral; clear wavy boundary.

Bz2—14 to 26 inches; gray (10YR 5/1) silty clay, gray (10YR 5/1) moist; moderate fine subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; few very fine roots; few very fine tubular pores; many medium seams and masses of salt; neutral; gradual wavy boundary.

Bkz—26 to 60 inches; grayish brown (10YR 5/2) silty clay, gray (10YR 5/1) moist; few fine distinct strong brown (7.5YR 5/6) redox concentrations; weak fine subangular blocky structure; very hard, very firm, slightly sticky, moderately plastic; common fine masses of salt and lime; strongly effervescent; slightly alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

Depth to the seasonal high water table: 24 to 42 inches

Az horizon

Hue: 10YR to 5Y

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 30 to 40 percent

Content of rock fragments: 0 to 5 percent pebbles

Electrical conductivity (mmhos/cm): 4 to 8

Sodium adsorption ratio: 0 to 20

Reaction: pH 6.6 to 8.4

Bz horizons

Hue: 10YR to 5Y

Value: 4 to 7 dry; 3 to 5 moist

Chroma: 1 to 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 (mmhos/cm): 4 to 8

Sodium adsorption ratio: 0 to 30

Reaction: pH 6.6 to 9.0

Bkz horizon

Hue: 10YR to 5Y

Value: 4 to 7 dry; 4 to 6 moist

Chroma: 1 to 3

Texture: Silty clay or clay

Clay content: 35 to 50 percent

Content of rock fragments: 0 to 10 percent pebbles

Electrical conductivity (mmhos/cm): 2 to 8

Sodium adsorption ratio: 0 to 20

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 9.0

349B—Marcott silty clay loam, cool, 0 to 4 percent slopes

Setting

Landform: Stream terraces

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Marcott and similar soils: 85 percent

Minor Components

Mcmanus and similar soils: 0 to 5 percent

Modesty and similar soils: 0 to 5 percent

Turrah and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silty clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Apparent

Salt affected: Saline within 30 inches

Sodium affected: Sodic within 30 inches

Available water capacity: Mainly 6.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

549B—Marcott silty clay loam, 0 to 4 percent slopes

Setting

Landform: Stream terraces

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Marcott and similar soils: 85 percent

Minor Components

Turrah and similar soils: 0 to 5 percent

Modesty and similar soils: 0 to 5 percent

Gregson and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silty clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Apparent

Salt affected: Saline within 30 inches

Sodium affected: Sodic within 30 inches

Available water capacity: Mainly 6.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Martinsdale Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderately slow

Landform: Alluvial fans and stream terraces

Parent material: Alluvium

Slope range: 0 to 35 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Typic Argiustolls

Typical Pedon

Martinsdale loam, 4 to 8 percent slopes, in an area of pasture, 3,200 feet north and 1,320 feet east of the southwest corner of sec. 4, T. 10 N., R. 12 W.

Ap—0 to 7 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard,

friable, moderately sticky, moderately plastic; many very fine roots; many fine tubular pores; neutral; clear smooth boundary.

Bt1—7 to 12 inches; brown (10YR 5/3) clay loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; hard, firm, moderately sticky, moderately plastic; many very fine roots; few fine tubular pores; few faint clay films on faces of peds; neutral; clear smooth boundary.

Bt2—12 to 27 inches; pale brown (10YR 6/3) clay loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; hard, firm, moderately sticky, moderately plastic; many very fine roots; few fine tubular pores; common faint clay films on faces of peds; neutral; gradual smooth boundary.

Bk1—27 to 38 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; soft, friable, slightly sticky, moderately plastic; few very fine roots; few very fine tubular pores; many fine seams of lime; strongly effervescent; moderately alkaline; gradual smooth boundary.

Bk2—38 to 60 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; few very fine roots; 5 percent pebbles; common fine seams of lime; strongly effervescent; strongly alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 16 inches

Depth to the Bk horizon: 11 to 30 inches

Ap horizon

Hue: 10YR or 7.5YR

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 18 to 27 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 horizons

Hue: 10YR or 7.5YR

Value: 4 to 6 dry; 2 to 4 moist

Chroma: 2 to 4

Clay content: 27 to 35 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles

Reaction: pH 6.6 to 8.4

Bk horizons

Hue: 10YR or 2.5Y
 Value: 6 to 8 dry; 4 to 7 moist
 Chroma: 2 to 4
 Clay content: 20 to 27 percent
 Content of rock fragments: 0 to 15 percent
 pebbles
 Electrical conductivity (mmhos/cm): 2 to 8
 Calcium carbonate equivalent: 15 to 35 percent
 Reaction: pH 7.9 to 9.0

52B—Martinsdale loam, 0 to 4 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 0 to 4 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Martinsdale and similar soils: 85 percent

Minor Components

Shawmut and similar soils: 0 to 5 percent
 Danvers and similar soils: 0 to 5 percent
 Quigley and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

52C—Martinsdale loam, 4 to 8 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Martinsdale and similar soils: 85 percent

Minor Components

Fairfield and similar soils: 0 to 4 percent
 Quigley and similar soils: 0 to 4 percent
 Danvers and similar soils: 0 to 4 percent
 Shawmut and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

52D—Martinsdale loam, 8 to 15 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Martinsdale and similar soils: 85 percent

Minor Components

Fairfield and similar soils: 0 to 4 percent

Quigley and similar soils: 0 to 4 percent

Danvers and similar soils: 0 to 4 percent

Shawmut and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

52E—Martinsdale loam, 15 to 35 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Martinsdale and similar soils: 85 percent

Minor Components

Fairfield and similar soils: 0 to 4 percent

Quigley and similar soils: 0 to 4 percent

Danvers and similar soils: 0 to 4 percent

Shawmut and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

352E—Martinsdale cobbly loam, 15 to 35 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Martinsdale and similar soils: 85 percent

Minor Components

Roy and similar soils: 0 to 4 percent

Shawmut and similar soils: 0 to 4 percent

Danvers and similar soils: 0 to 4 percent

Winspect and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Mccabe Series

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly drained

Permeability: Moderately rapid

Landform: Flood plains

Parent material: Alluvium

Slope range: 0 to 2 percent

Elevation range: 3,600 to 5,800 feet

Annual precipitation: 10 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 105 days

Taxonomic Class: Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, nonacid, frigid Aeric Fluvaquents

Typical Pedon

Mccabe sandy loam, in an area of Mccabe-Canarway complex, 0 to 2 percent slopes, occasionally flooded, in an area of pasture, 2,350 feet south and 100 feet east of the northwest corner of sec. 22, T. 11 N., R. 15 W.

A—0 to 2 inches; very dark grayish brown (10YR 3/2) sandy loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; soft, friable, slightly sticky, slightly plastic; many very fine and fine roots; common fine tubular pores; neutral; clear smooth boundary.

C1—2 to 4 inches; very dark grayish brown (10YR 3/2) fine sandy loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine interstitial pores; slightly alkaline; clear smooth boundary.

C2—4 to 9 inches; dark grayish brown (10YR 4/2) sandy loam, grayish brown (10YR 5/2) dry; moderate medium granular structure; soft, friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine tubular pores; slightly alkaline; gradual wavy boundary.

C3—9 to 16 inches; dark grayish brown (10YR 4/2) sandy loam consisting of strata of loam, fine sandy loam and sandy loam, grayish brown (10YR 5/2) dry; many medium distinct yellowish brown (10YR 5/8), brownish yellow (10YR 6/8) dry redox concentrations; weak fine subangular blocky structure; soft, very friable, nonsticky, slightly plastic; common very fine and fine roots; few fine tubular pores; slightly alkaline; clear wavy boundary.

C4—16 to 36 inches; dark grayish brown (10YR 4/2) fine sandy loam consisting of strata of loam and fine sandy loam, grayish brown (10YR 5/2) dry; many medium distinct yellowish brown (10YR 5/8), brownish yellow (10YR 6/8) dry redox

concentrations; weak fine granular structure; soft, very friable, nonsticky, nonplastic; common very fine and fine roots; few fine tubular pores; slightly alkaline; clear wavy boundary.

2C5—36 to 60 inches; very dark grayish brown (10YR 3/2) very gravelly loamy sand, grayish brown (10YR 5/2) dry, single grain; loose, nonsticky, nonplastic; common very fine and fine roots; few fine tubular pores; 20 percent cobbles and 35 percent pebbles; slightly alkaline.

Range in Characteristics:

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the seasonal high water table: 12 to 24 inches

A horizon

Value: 3 to 5 moist; 5 or 6 dry

Chroma: 1 or 2

Clay content: 5 to 15 percent

Calcium carbonate equivalent: 0 to 5 percent

Reaction: pH 5.1 to 7.8

C1 and C2 horizons

Value: 3 to 6 moist; 5 to 7 dry

Chroma: 1 or 2

Texture: Loam, sandy loam, or fine sandy loam

Clay content: 10 to 18 percent with less than 50 percent fine and coarser sand

Calcium carbonate equivalent: 0 to 10 percent

Reaction: pH 6.6 to 8.4

C3 and C4 horizons

Value: 3 or 4 moist; 5 or 6 dry

Chroma: 1 to 3

Redox concentrations: Hue 10YR or 2.5YR; Value 5 or 6 dry, 4 or 5 moist; Chroma 4, 5, 6 or 8

Texture: Loam, very fine sandy loam, fine sandy loam, or sandy loam

Clay content: 5 to 18 percent with less than 50 percent fine and coarser sand

Reaction: pH 6.6 to 8.4

2C5 horizon

Value: 3 or 4 moist; 5 or 6 dry

Chroma: 1 or 2

Texture: Loamy sand or sand

Clay content: 0 to 10 percent

Content of rock fragments: 40 to 60 percent—15 to 25 percent cobbles; 25 to 35 percent pebbles

Calcium carbonate equivalent: 0 to 15 percent
Reaction: pH 6.6 to 7.8

10A—Mccabe-Canarway complex, impacted, 0 to 2 percent slopes, occasionally flooded

Setting

Landform:

- Mccabe—Flood plains
- Canarway—Flood plains

Position on landform:

- Mccabe—Treads
- Canarway—Treads

Slope:

- Mccabe—0 to 2 percent
- Canarway—0 to 2 percent

Elevation: 3,600 to 5,800 feet

Mean annual precipitation: 10 to 19 inches

Frost-free period: 70 to 105 days

Composition

Major Components

Mccabe and similar soils: 45 percent
Canarway and similar soils: 40 percent

Minor Components

Nythar and similar soils: 0 to 5 percent
Bandy and similar soils: 0 to 5 percent
Water: 0 to 5 percent

Major Component Description

Mccabe

Surface layer texture: Sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Dominant parent material: Alluvium
Flooding: Occasional
Water table: Apparent
Available water capacity: Mainly 6.1 inches

Canarway

Surface layer texture: Gravelly sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Dominant parent material: Alluvium
Flooding: Occasional
Water table: Apparent
Available water capacity: Mainly 2.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

11A—Mccabe-Canarway complex, 0 to 2 percent slopes, occasionally flooded

Setting

Landform:

- Mccabe—Flood plains
- Canarway—Flood plains

Position on landform:

- Mccabe—Treads
- Canarway—Treads

Slope:

- Mccabe—0 to 2 percent
- Canarway—0 to 2 percent

Elevation: 3,600 to 5,800 feet

Mean annual precipitation: 10 to 19 inches

Frost-free period: 70 to 105 days

Composition

Major Components

Mccabe and similar soils: 45 percent
Canarway and similar soils: 40 percent

Minor Components

Nythar and similar soils: 0 to 5 percent
Bandy and similar soils: 0 to 5 percent
Water: 0 to 5 percent

Major Component Description

Mccabe

Surface layer texture: Sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Water table: Apparent
Available water capacity: Mainly 6.1 inches

Canarway

Surface layer texture: Gravelly sandy loam
Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Water table: Apparent
Available water capacity: Mainly 2.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Mcmanus Series

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Moderate

Landform: Alluvial fans and stream terraces

Parent material: Alluvium

Slope range: 0 to 4 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 10 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 105 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Oxyaquic Haplustolls

Typical Pedon

Mcmanus silty clay loam, 0 to 4 percent slopes, in an area of hayland, 700 feet north and 400 feet west of the southeast corner of sec. 24, T. 10 N., R. 13 W.

A1—0 to 7 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate medium subangular blocky structure; slightly hard, friable, moderately sticky, slightly plastic; many fine and very fine roots, many very fine and fine discontinuous pores; moderately alkaline; gradual smooth boundary.

A2—7 to 14 inches; very dark gray (10YR 3/1) silt loam, gray (10YR 5/1) dry; moderate medium subangular blocky structure; slightly hard, friable, moderately sticky, slightly plastic; many very fine and common medium roots; many very fine irregular pores; moderately alkaline; clear smooth boundary.

Bk1—14 to 27 inches; dark grayish brown (10YR 4/2) loam, light brownish gray (10YR 6/2) dry; few fine faint brownish yellow 10YR 6/6) redox concentrations; moderate medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; common very fine and fine roots; many very fine irregular pores; disseminated lime; few fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk2—27 to 34 inches; grayish brown (10YR 5/2) loam, light brownish gray (10YR 6/2) dry; few fine faint brownish yellow (10YR 6/6) redox concentrations; weak medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; few very fine irregular pores; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk3—34 to 42 inches; brown (10YR 5/3) sandy loam, pale brown (10YR 6/3) dry; few fine faint brownish yellow (10YR 6/6); redox concentrations; weak fine subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; few very fine and fine roots; few fine irregular tubular pores; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk4—42 to 60 inches; brown (10YR 5/3) very gravelly sandy clay loam, pale brown (10YR 6/3) dry; many faint brownish yellow (10YR 6/6) redox concentrations; massive; slightly hard, very friable, slightly sticky, slightly plastic; few very fine and fine roots; few fine irregular tubular pores; 5 percent cobbles, 40 percent pebbles; disseminated lime; few fine masses of lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

Depth to the seasonal high water table: 24 to 42 inches

Depth to the Bk horizon: 7 to 14 inches

A horizons

Value: 2 or 3 moist; 3 to 5 dry

Chroma: 1 to 3

Texture: Loam, clay loam, silt loam, or silty clay loam

Clay content: 18 to 40 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles

Reaction: 7.4 to 8.4

Bk1 horizon

Value: 2 to 5 moist; 5 or 6 dry

Chroma: 1 to 4

Texture: Loam, sandy loam, silty clay loam, or clay loam

Clay content: 18 to 35 percent

Content of rock fragments: 0 to 15 percent—0 to 10 percent cobbles; 0 to 5 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent
Reaction: 7.4 to 8.4

Bk2 horizon

Hue: 10YR or 2.5Y

Value: 2 to 5 moist; 5 or 6 dry

Chroma: 1 or 2

Texture: Loam, clay loam, fine sandy loam, or silty 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
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: 7.4 to 8.4

Bk3 horizon

Hue: 2.5Y or 10YR
 Value: 3 to 5 moist; 5 or 6 dry
 Chroma: 1 to 4
 Texture: Loam, clay loam, or sandy loam
 Clay content: 15 to 35 percent
 Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: 7.4 to 8.4

Bk4 horizon

Hue: 2.5 or 10YR
 Value: 3 to 5 moist; 5 or 6 dry
 Chroma: 1 to 4
 Texture: Sandy clay loam, sandy loam, or loam
 Clay content: 15 to 30 percent
 Content of rock fragments: 10 to 60 percent—5 to 20 percent cobbles; 5 to 40 percent pebbles
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: 7.4 to 8.4

**425B—Mcmanus silty clay loam,
 0 to 4 percent slopes**

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Treads
Slope: 0 to 4 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Composition

Major Components

Mcmanus and similar soils: 85 percent

Minor Components

Modesty and similar soils: 0 to 5 percent
 Gregson and similar soils: 0 to 5 percent
 Mannixlee and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Dominant parent material: Alluvium

Native plant cover type: Rangeland
Flooding: None
Water table: Apparent
Available water capacity: Mainly 8.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

**525B—Mcmanus silty clay loam, cool,
 0 to 4 percent slopes**

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Treads
Slope: 0 to 4 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Mcmanus and similar soils: 85 percent

Minor Components

Modesty and similar soils: 0 to 5 percent
 Saypo and similar soils: 0 to 4 percent
 Con and similar soils: 0 to 4 percent
 Mannixlee and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Apparent
Available water capacity: Mainly 8.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Mocmont Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Mountains

Parent material: Colluvium derived from argillite

Slope range: 15 to 60 percent

Elevation range: 3,600 to 6,400 feet

Annual precipitation: 18 to 25 inches

Annual air temperature: 38 to 42 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Typic Haplustalfs

Typical Pedon

Mocmont gravelly loam, cool, 35 to 60 percent slopes, in an area of woodland, 2,000 feet north and 2,100 feet east of the southwest corner of sec. 13, T. 11 N., R. 16 W.

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

E—0 to 7 inches; light brownish gray (10YR 6/2) gravelly loam; dark grayish brown (10YR 4/2) moist; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 5 percent cobbles and 15 percent pebbles; neutral; clear smooth boundary.

E/Bt—7 to 13 inches; E part (75 percent) is very pale brown (10YR 7/3) very gravelly loam, brown (10YR 4/3) moist; B part (25 percent) is pale brown (10YR 6/3) very gravelly loam, dark brown (10YR 4/3) moist; moderate fine granular structure; soft, slightly hard, slightly sticky, slightly plastic; many very fine, fine and coarse roots; many very fine and fine tubular pores; 15 percent cobbles and 45 percent pebbles; neutral; gradual wavy boundary.

Bt1—13 to 23 inches; pale brown (10YR 6/3) very cobbly clay loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; many very fine and fine and common medium roots; many very fine and fine tubular pores; few faint clay films on faces of peds; 15 percent cobbles and 30 percent pebbles; neutral; gradual wavy boundary.

Bt2—23 to 38 inches; light yellowish brown (10YR 6/4) very cobbly clay loam, dark yellowish brown

(10YR 4/4) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; many very fine and fine roots; many very fine and fine tubular pores; few faint clay films on faces of peds; 25 percent cobbles and 30 percent pebbles; neutral; gradual wavy boundary.

BC—38 to 60 inches; light yellowish brown (10YR 6/4) very cobbly loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine and fine tubular pores; 25 percent cobbles and 35 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 42 to 45 degrees F

Moisture control section: Between 4 and 12 inches

E horizon

Hue: 10YR or 7.5YR

Value: 6 or 7 dry; 4 or 5 moist

Chroma: 2 or 3

Clay content: 15 to 25 percent

Content of rock fragments: 15 to 35 percent—5 to 10 percent cobbles; 10 to 25 percent pebbles

Reaction: 5.1 to 7.3

E/Bt horizon

Hue: 10YR or 7.5YR

Value: E part—6 or 7 dry, 4 or 5 moist; B part—5 or 6 dry, 4 or 5 moist

Chroma: 2 to 4

Texture: E part—sandy loam or loam; B part—loam or clay loam

Clay content: E part—15 to 20 percent; B part—25 to 30 percent

Content of rock fragments: 40 to 60 percent—15 to 20 percent cobbles; 25 to 45 percent pebbles

Reaction: 5.6 to 7.3

Bt horizons

Hue: 10YR or 7.5YR

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 3, 4, or 6

Texture: Loam, clay loam, or sandy clay loam

Clay content: 18 to 30 percent

Content of rock fragments: 40 to 80 percent—15 to 30 percent cobbles; 25 to 50 percent pebbles

Reaction: 5.1 to 7.3

BC horizon

Hue: 10YR or 7.5YR
 Value: 5, or 6 dry; 4 or 5 moist
 Chroma: 3, 4, or 6
 Texture: Loam or sandy loam
 Clay content: 10 to 25 percent
 Content of rock fragments: 60 to 80 percent—
 25 to 40 percent cobbles; 35 to 50 percent
 pebbles
 Reaction: 5.1 to 7.3

90E—Mocmont gravelly loam, 15 to 35 percent slopes**Setting**

Landform: Mountains
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent, southwest aspect
Elevation: 3,600 to 6,400 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Mocmont and similar soils: 85 percent

Minor Components

Yreka and similar soils: 0 to 5 percent
 Winkler and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Argillite colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

90F—Mocmont gravelly loam, 35 to 60 percent slopes**Setting**

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent, southwest aspect
Elevation: 3,600 to 6,400 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Mocmont and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 7 percent
 Yreka and similar soils: 0 to 6 percent
 Winkler and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Argillite colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

190E—Mocmont gravelly loam, cool, 15 to 35 percent slopes**Setting**

Landform: Mountains
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent, northeast aspect
Elevation: 3,600 to 6,400 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Mocmont and similar soils: 85 percent

Minor Components

Yreka and similar soils: 0 to 8 percent

Areas of rock outcrop: 0 to 7 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Argillite colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

190F—Mocmont gravelly loam, cool, 35 to 60 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and shoulders

Slope: 35 to 60 percent, northeast aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Mocmont and similar soils: 85 percent

Minor Components

Yreka and similar soils: 0 to 8 percent

Areas of rock outcrop: 0 to 7 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Argillite colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Modesty Series

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Moderately slow to the 2C horizon, moderately rapid below

Landform: Stream terraces and alluvial fans

Parent material: Alluvium

Slope range: 0 to 4 percent

Elevation range: 3,600 to 4,600 feet

Annual precipitation: 10 to 19 inches

Annual air temperature: 41 to 45 degrees F

Frost-free period: 70 to 105 days

Taxonomic Class: Fine-silty, mixed, superactive, frigid Aquic Haplustolls

Typical Pedon

Modesty silty clay loam, 0 to 4 percent slopes, in an area of cropland, 1,300 feet south and 2,550 feet west of the northeast corner of sec. 19, T. 10 N., R. 12 W.

Oe—1 inch to 0; partially decomposed organic matter.

A—0 to 8 inches; dark gray (10YR 4/1) silty clay loam, very dark gray (10YR 3/1) moist; moderate fine granular structure; very hard, firm, nonsticky, moderately plastic; many very fine and fine roots; common very fine and fine irregular pores; neutral; clear smooth boundary.

Bw1—8 to 15 inches; gray (10YR 5/1) silty clay loam, very dark gray (10YR 3/1) moist; moderate very fine subangular blocky structure; very hard, firm, nonsticky, moderately plastic; many very fine and fine roots; common very fine and fine irregular pores; neutral; clear smooth boundary.

Bw2—15 to 31 inches; gray (10YR 6/1) silty clay loam, very dark gray (10YR 3/1) moist; moderate fine and medium subangular blocky structure; very hard, firm, nonsticky, moderately plastic; common fine and very fine roots; common very fine and fine irregular pores; neutral; clear smooth boundary.

Bw3—31 to 38 inches; light gray (10YR 7/2) loam; dark grayish brown (10YR 4/2) moist; few fine faint strong brown (7.5YR 5/6) redox concentrations; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine roots; common very fine and fine irregular pores; slightly alkaline; clear smooth boundary.

2C—38 to 60 inches; light gray (10YR 7/2) very gravelly loam; grayish brown (10YR 5/3) moist; massive; slightly hard, very friable; slightly sticky, slightly plastic; common very fine roots; common very fine and fine irregular pores; 10 percent cobbles and 25 percent pebbles; slightly alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 16 inches

Depth to the seasonal high water table: 24 to 42 inches

Depth to the 2C horizon: 37 to 60 inches

A horizon

Value: 2 or 3 moist; 4 or 5 dry

Chroma: 0 to 2

Clay content: 27 to 35 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles

Reaction: pH 6.6 to 7.3

Bw1 horizon

Hue: 10YR or 7.5YR

Value: 3 or 4 moist; 4 or 5 dry

Chroma: 1 or 2

Texture: Silty clay loam, silt loam, or 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

Reaction: pH 6.6 to 7.3

Bw2 horizon

Hue: 10YR or 7.5YR

Value: 3 or 4 moist; 5 or 6 dry

Chroma: 1 to 4

Texture: Loam, clay loam, silty clay loam, or silt 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

Reaction: pH 6.6 to 7.3

Bw3 horizon

Hue: 10YR or 7.5YR

Value: 3 or 4 moist; 5 to 7 dry

Chroma: 1 to 4

Texture: Loam, clay loam, or silty 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

Reaction: pH 6.6 to 7.8

2C horizon

Hue: 10YR or 7.5YR

Value: 4 or 5 moist; 5 to 7 dry

Chroma: 2 to 4

Texture: Loam or sandy loam

Clay content: 18 to 27 percent

Content of rock fragments: 15 to 45 percent—5 to 15 percent cobbles; 10 to 30 percent pebbles

Reaction: pH 6.6 to 7.8

555B—Modesty silty clay loam, cool, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 3,600 to 4,600 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Modesty and similar soils: 85 percent

Minor Components

Mannixlee and similar soils: 0 to 5 percent

Gregson and similar soils: 0 to 5 percent

Mcmanus and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silty clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Apparent

Available water capacity: Mainly 9.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

565B—Modesty silty clay loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Treads
Slope: 0 to 4 percent
Elevation: 3,600 to 4,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Composition

Major Components

Modesty and similar soils: 85 percent

Minor Components

Gregson and similar soils: 0 to 5 percent
 Mcmanus and similar soils: 0 to 4 percent
 Con and similar soils: 0 to 4 percent
 Blossberg and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Silty clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Apparent
Available water capacity: Mainly 9.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Mollet Series

Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Permeability: Slow
Landform: Mountains
Parent material: Alluvium and colluvium from fine grained extrusive igneous rocks
Slope range: 4 to 60 percent
Elevation range: 5,800 to 7,000 feet
Annual precipitation: 15 to 22 inches
Annual air temperature: 34 to 39 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Fine, mixed, superactive Ustic Argicryolls

Typical Pedon

Mollet loam, 4 to 15 percent slopes, in an area of rangeland, 700 feet south and 1,900 feet west of the northeast corner of sec. 5, T. 6 N., R. 14 W.

A—0 to 10 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; 5 percent pebbles; neutral; gradual smooth boundary.

Bt1—10 to 20 inches; pinkish gray (5YR 6/2) clay loam, reddish brown (5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, moderately sticky, moderately plastic; common very fine and fine roots; few fine tubular pores; few faint clay films on faces of peds; 10 percent pebbles; neutral; gradual wavy boundary.

Bt2—20 to 28 inches; reddish brown (5YR 5/4) clay; reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure; hard, firm, moderately sticky, moderately plastic; few very fine roots; common faint clay films on faces of peds; 5 percent cobbles and 5 percent pebbles; neutral; gradual wavy boundary.

Bt3—28 to 60 inches; reddish brown (5YR 5/4) gravelly clay loam; reddish brown (5YR 4/4) moist; weak coarse prismatic structure; hard, very firm, moderately sticky, moderately plastic; few very fine roots; few faint clay films on faces of peds; 5 percent cobbles and 15 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 36 to 41 degrees F
Moisture control section: Between 4 and 12 inches
Thickness of the mollic epipedon: 10 to 16 inches

A horizon

Value: 3 or 4 dry; 2 or 3 moist
 Chroma: 1 or 2
 Clay content: 20 to 27 percent
 Content of rock fragments: 0 to 30 percent—0 to 10 percent cobbles; 0 to 20 percent pebbles
 Reaction: pH 5.6 to 7.3

Bt horizons

Value: 4 to 6 dry; 3 or 4 moist
 Chroma: 2 to 4
 Texture: Clay loam or clay

Clay content: 35 to 50 percent
 Content of rock fragments: 0 to 30 percent—0 to
 5 percent cobbles; 0 to 25 percent pebbles
 Reaction: pH 5.6 to 7.3

48D—Mollet loam, 4 to 15 percent slopes

Setting

Landform: Mountains
Position on landform: Footslopes and toeslopes
Slope: 4 to 15 percent
Elevation: 5,800 to 7,000 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Mollet and similar soils: 85 percent

Minor Components

Redchief and similar soils: 0 to 10 percent
 Libeg and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Nirling Series

Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Permeability: Rapid
Landform: Stream terraces, flood plains, and alluvial fans
Parent material: Alluvium
Slope range: 0 to 4 percent
Elevation range: 3,600 to 6,200 feet
Annual precipitation: 10 to 19 inches
Annual air temperature: 39 to 44 degrees F
Frost-free period: 70 to 105 days

Taxonomic Class: Sandy-skeletal, mixed, frigid
 Oxyaquic Haplustolls

Typical Pedon

Nirling cobbly loam, 0 to 4 percent slopes, in an area of irrigated pasture, 150 feet north and 600 feet west of the southeast corner of sec. 31, T. 10 N., R. 13 W.

A1—0 to 5 inches; dark brown (10YR 4/3) cobbly loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; slightly hard, friable, slightly sticky, moderately plastic; many fine and very fine and common medium roots; many fine and very fine interstitial pores; 10 percent cobbles and 15 percent pebbles; neutral; clear smooth boundary.

A2—5 to 10 inches; dark grayish brown (10YR 4/2) very gravelly loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure parting to moderate medium granular; slightly hard, friable, slightly sticky, slightly plastic; many fine and very fine and common medium roots; many fine and very fine interstitial pores; 10 percent cobbles and 40 percent pebbles; neutral; clear smooth boundary.

Bw—10 to 15 inches; brown (10YR 5/3) extremely gravelly coarse sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; many very fine roots; common fine and very fine interstitial pores; 20 percent cobbles and 50 percent pebbles; neutral; gradual smooth boundary.

2C1—15 to 29 inches; yellowish brown (10YR 5/4) extremely gravelly coarse sand; dark yellowish brown (10YR 3/4) moist; single grain; loose, nonsticky, nonplastic; many very fine roots; 20 percent cobbles and 50 percent pebbles; neutral; gradual smooth boundary.

2C2—29 to 60 inches; yellowish brown (10YR 5/4) extremely cobbly coarse sand; dark yellowish brown (10YR 3/4) moist; single grain; loose, nonsticky, nonplastic; common very fine roots; 35 percent cobbles and 40 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 41 to 46 degrees F
Moisture control section: Between 4 and 12 inches
Thickness of the mollic epipedon: 7 to 15 inches
Depth to the 2C horizon: 14 to 18 inches
Depth to the seasonal high water table: 24 to 42 inches

A1 horizon

Value: 2 or 3 moist; 4 or 5 dry
 Chroma: 2 or 3

Clay content: 8 to 27 percent
 Content of rock fragments: 15 to 60 percent—0 to 30 percent cobbles; 15 to 30 percent pebbles
 Reaction: pH 6.6 to 7.3

A2 horizon

Value: 2 or 3 moist; 4 or 5 dry
 Chroma: 2 or 3
 Texture: Loam or sandy loam
 Clay content: 8 to 27 percent
 Content of rock fragments: 35 to 70 percent—5 to 25 percent cobbles; 30 to 45 percent pebbles
 Reaction: pH 6.6 to 7.3

Bw horizon

Value: 2 or 3 moist; 4 to 6 dry
 Texture: Sandy loam, coarse sandy loam, or loamy sand
 Clay content: 6 to 20 percent
 Content of rock fragments: 35 to 70 percent—10 to 20 percent cobbles; 25 to 50 percent pebbles
 Reaction: pH 6.6 to 7.8

2C horizons

Value: 3 or 4 moist; 5 or 6 dry
 Texture: Loamy sand, coarse sand, or sand
 Clay content: 0 to 5 percent
 Content of rock fragments: 35 to 85 percent—10 to 35 percent cobbles; 25 to 50 percent pebbles
 Reaction: pH 6.6 to 7.8

324B—Nirling very cobbly loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Treads
Slope: 0 to 4 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Composition

Major Components

Nirling and similar soils: 85 percent

Minor Components

Bandy and similar soils: 0 to 8 percent
 Windlass and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Very cobbly loam
Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Apparent
Available water capacity: Mainly 2.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

524B—Nirling gravelly loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Treads
Slope: 0 to 4 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Nirling and similar soils: 85 percent

Minor Components

Bandy and similar soils: 0 to 4 percent
 Windlass and similar soils: 0 to 4 percent
 Gregson and similar soils: 0 to 4 percent
 Dominic and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Apparent
Available water capacity: Mainly 2.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

624B—Nirling-Bandy complex, 0 to 4 percent slopes, rarely flooded

Setting

Landform:

- Nirling—Flood plains
- Bandy—Flood plains

Position on landform:

- Nirling—Treads
- Bandy—Treads

Slope:

- Nirling—0 to 4 percent
- Bandy—0 to 4 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 10 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Nirling and similar soils: 45 percent

Bandy and similar soils: 40 percent

Minor Components

Flintcreek and similar soils: 0 to 4 percent

Blossberg and similar soils: 0 to 4 percent

Windlass and similar soils: 0 to 4 percent

Poronto and similar soils: 0 to 3 percent

Major Component Description

Nirling

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Apparent

Available water capacity: Mainly 2.5 inches

Bandy

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Apparent

Available water capacity: Mainly 2.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

924B—Nirling cobbly loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 3,600 to 6,000 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Nirling and similar soils: 85 percent

Minor Components

Bandy and similar soils: 0 to 4 percent

Windlass and similar soils: 0 to 4 percent

Gregson and similar soils: 0 to 4 percent

Cetrack and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Apparent

Available water capacity: Mainly 2.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Nythar Series

Depth class: Very deep (more than 60 inches)

Drainage class: Very poorly drained

Permeability: Moderate

Landform: Alluvial fans, stream terraces, and flood plains

Parent material: Alluvium

Slope range: 0 to 4 percent

Elevation range: 3,600 to 6,000 feet

Annual precipitation: 10 to 19 inches

Annual air temperature: 39 to 44 degrees

Frost-free period: 70 to 105 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Cumulic Endoaquolls

Typical Pedon

Nythar silty clay loam, in an area of Nythar-Flintcreek complex, 0 to 4 percent slopes, in an area of pasture, 2,350 feet north and 700 feet east of the southwest corner of sec. 28, T. 10 N., R. 13 W.

Oi—2.5 inches to 0; partially decomposed organic matter.

A—0 to 14 inches; black (2.5Y 2/0) silty clay loam, black (2.5Y 2/0) dry; moderate medium granular structure; hard, friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; common fine tubular pores; 5 percent pebbles and 5 percent cobbles; neutral; gradual wavy boundary.

Bg1—14 to 23 inches; very dark gray (2.5Y 3/0) silty clay loam, gray (10YR 5/1) dry; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine roots; common fine and medium pores; 5 percent pebbles, 5 percent cobbles; neutral; gradual wavy boundary.

Bg2—23 to 34 inches; very dark gray (5Y 3/1) silty clay loam, gray (2.5Y 5/0) dry; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine roots; common fine and medium pores; 5 percent pebbles and 5 percent cobbles; neutral; gradual wavy boundary.

Bg3—34 to 44 inches; dark grayish brown (2.5Y 4/2) silt loam, light gray (5Y 7/1) dry; many medium brownish yellow (10YR 6/6) redox concentrations; weak medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; few very fine roots; common fine pores; neutral; gradual wavy boundary.

Cg—44 to 60 inches; light gray (2.5Y 7/2) cobbly silty clay loam, white (2.5Y 8/2) dry; many medium yellow (10YR 7/6) redox concentrations; single grain; loose, slightly sticky, slightly plastic; few very fine roots; common fine pores; 15 percent pebbles and 15 percent cobbles; neutral.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 24 to 34 inches

Depth to the seasonal high water table: 0 to 12 inches

A horizon

Hue: 2.5Y or 10YR

Value: 2 or 3 moist; 2 to 4 dry

Chroma: 0 to 2

Clay content: 27 to 35 percent

Content of rock fragments: 0 to 10 percent—0 to 5 percent cobbles; 0 to 5 percent pebbles

Reaction: pH 6.6 to 7.3

Bg1 and Bg2 horizons

Hue: 5Y to 10YR

Value: 2 or 3 moist; 4 or 5 dry

Chroma: 0 or 1

Texture: Silty clay loam, loam, or silt loam

Clay content: 18 to 35 percent

Content of rock fragments: 0 to 35 percent—0 to 5 percent cobbles; 0 to 30 percent pebbles

Reaction: 6.6 to 7.3

Bg3 horizon

Hue: 5Y to 10YR

Value: 2 to 4 moist; 4 to 7 dry

Chroma: 1 or 2

Texture: Silt loam, loam, or silty clay loam

Clay content: 18 to 35 percent

Content of rock fragments: 0 to 35 percent—0 to 5 percent cobbles; 0 to 30 percent pebbles

Reaction: 6.6 to 7.3

Cg horizon

Hue: 2.5Y or 10YR

Value: 4 to 7 moist; 5 to 8 dry

Chroma: 1 or 2

Texture: Silty clay loam, loam, or sandy 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: 6.6 to 7.3

735B—Nythar-Flintcreek complex, 0 to 4 percent slopes

Setting

Landform:

- Nythar—Alluvial fans and stream terraces
- Flintcreek—Alluvial fans and stream terraces

Position on landform:

- Nythar—Treads
- Flintcreek—Treads

Slope:

- Nythar—0 to 4 percent
- Flintcreek—0 to 4 percent

Elevation: 3,600 to 6,000 feet*Mean annual precipitation:* 10 to 19 inches*Frost-free period:* 70 to 105 days**Composition****Major Components**

Nythar and similar soils: 45 percent

Flintcreek and similar soils: 40 percent

Minor Components

Mannixlee and similar soils: 0 to 3 percent

Blossberg and similar soils: 0 to 3 percent

Poronto and similar soils: 0 to 3 percent

Bandy and similar soils: 0 to 3 percent

Gregson and similar soils: 0 to 3 percent

Major Component Description**Nythar***Surface layer texture:* Silty clay loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Very poorly drained*Dominant parent material:* Alluvium*Native plant cover type:* Rangeland*Flooding:* None*Water table:* Apparent*Available water capacity:* Mainly 10.0 inches**Flintcreek***Surface layer texture:* Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Very poorly drained*Dominant parent material:* Alluvium*Native plant cover type:* Rangeland*Flooding:* None*Water table:* Apparent*Available water capacity:* Mainly 5.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

**755B—Nythar mucky peat,
0 to 4 percent slopes****Setting***Landform:* Alluvial fans and stream terraces*Position on landform:* Treads*Slope:* 0 to 4 percent*Elevation:* 3,600 to 6,000 feet*Mean annual precipitation:* 10 to 19 inches*Frost-free period:* 70 to 105 days**Composition****Major Components**

Nythar and similar soils: 85 percent

Minor Components

Mannixlee and similar soils: 0 to 3 percent

Blossberg and similar soils: 0 to 3 percent

Poronto and similar soils: 0 to 3 percent

Bandy and similar soils: 0 to 3 percent

Gregson and similar soils: 0 to 3 percent

Major Component Description*Surface layer texture:* Silty clay loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Very poorly drained*Dominant parent material:* Alluvium*Native plant cover type:* Rangeland*Flooding:* None*Water table:* Apparent*Available water capacity:* Mainly 10.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

**835B—Nythar-Flintcreek complex,
0 to 4 percent slopes, rarely flooded****Setting***Landform:*

- Nythar—Flood plains
- Flintcreek—Flood plains

Position on landform:

- Nythar—Treads
- Flintcreek—Treads

Slope:

- Nythar—0 to 4 percent
- Flintcreek—0 to 4 percent

Elevation: 3,600 to 6,000 feet*Mean annual precipitation:* 10 to 19 inches*Frost-free period:* 70 to 105 days**Composition****Major Components**

Nythar and similar soils: 50 percent

Flintcreek and similar soils: 35 percent

Minor Components

Blossberg and similar soils: 0 to 3 percent

Dougcliff and similar soils: 0 to 3 percent

Mannixlee and similar soils: 0 to 3 percent

Modesty and similar soils: 0 to 3 percent

Major Component Description**Nythar***Surface layer texture:* Silty clay loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Very poorly drained*Dominant parent material:* Alluvium*Native plant cover type:* Rangeland*Flooding:* Rare*Water table:* Apparent*Available water capacity:* Mainly 10.0 inches**Flintcreek***Surface layer texture:* Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Very poorly drained*Dominant parent material:* Alluvium*Native plant cover type:* Rangeland*Flooding:* Rare*Water table:* Apparent*Available water capacity:* Mainly 5.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Ovando Series*Depth class:* Very deep (more than 60 inches)*Drainage class:* Excessively drained*Permeability:* Rapid*Landform:* Mountains*Parent material:* Colluvium derived from granite*Slope range:* 2 to 60 percent*Elevation range:* 5,600 to 7,500 feet*Annual precipitation:* 22 to 30 inches*Annual air temperature:* 35 to 38 degrees F*Frost-free period:* 30 to 70 days

Taxonomic Class: Sandy-skeletal, mixed Lamellic Cryorthents

Typical Pedon

Ovando stony sandy loam, in an area of Elkner-Ovando complex, 15 to 35 percent slopes, in an area of woodland, 600 feet south and 2,800 feet east of the northwest corner of sec. 4, T. 12 N., R. 14 W.

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

E1—0 to 6 inches; light brownish gray (10YR 6/2) stony sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine, fine, and medium and few very coarse roots; common very fine and fine tubular pores; 20 percent stones; 5 percent pebbles; slightly acid; clear smooth boundary.

E2—6 to 12 inches; pale brown (10YR 6/3) very stony sandy loam, brown (10YR 4/3) moist; moderate medium granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine, fine, and medium and few very coarse roots; many very fine and fine tubular pores; 40 percent stones; 5 percent pebbles; slightly acid; clear smooth boundary.

E and Bt—12 to 25 inches; E part (80 percent) is light gray (10YR 7/2) very stony loamy coarse sand, grayish brown (10YR 5/2) moist; B part (20 percent) is grayish brown (10YR 5/2) very stony loamy coarse sand lamellae 1/8- to 1/4-inch thick, dark grayish brown (10YR 4/2) moist; weak fine granular structure; slightly hard, friable, nonsticky, nonplastic; many very fine and fine and few medium roots; 45 percent stones; 5 percent cobbles; moderately acid; clear wavy boundary.

C—25 to 60 inches; light gray (10YR 7/2) extremely stony loamy coarse sand, grayish brown (10YR 5/2) moist; massive; slightly hard, friable, nonsticky, nonplastic; few very fine, fine, and coarse roots; 60 percent stones; 10 percent cobbles; moderately acid.

Range in Characteristics

Soil temperature: 37 to 44 degrees F

Moisture control section: Between 12 and 35 inches

E horizons

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 4 or 5 moist

Chroma: 2 to 4

Clay content: 0 to 10 percent

Content of rock fragments: 20 to 65 percent—
15 to 40 percent stones; 0 to 15 percent
cobbles; 5 to 10 percent pebbles

Reaction: pH 5.6 to 6.5

E and Bt horizon

Hue: 10YR or 2.5Y

Value: E part—6 or 7 dry, 4 or 5 moist; B part—
4 or 5 dry, 4 or 5 moist

Chroma: 2 to 4

Texture: Loamy coarse sand or loamy sand

Clay content: 0 to 5 percent

Content of rock fragments: 35 to 60 percent—
35 to 45 percent stones; 0 to 10 percent
cobbles; 0 to 5 percent pebbles

Reaction: pH 5.6 to 6.5

C horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 4 or 5 moist

Chroma: 2 to 4

Clay content: 0 to 5 percent

Content of rock fragments: 60 to 80 percent—
60 to 65 percent stones; 0 to 10 percent
cobbles; 0 to 5 percent pebbles

Reaction: pH 5.6 to 6.5

180F—Ovando-Elkner stony sandy loams, 35 to 60 percent slopes

Setting

Landform:

- Ovando—Mountains
- Elkner—Mountains

Position on landform:

- Ovando—Backslopes and shoulders
- Elkner—Backslopes and shoulders

Slope:

- Ovando—35 to 60 percent
- Elkner—35 to 60 percent

Elevation: 5,600 to 7,500 feet

Mean annual precipitation: 22 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Ovando and similar soils: 50 percent

Elkner and similar soils: 35 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Rubble land: 0 to 5 percent

Soils that have very gravelly, clayey subsoils: 0 to
5 percent

Major Component Description

Ovando

Surface layer texture: Stony sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Excessively drained

Dominant parent material: Granitic colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.0 inches

Elkner

Surface layer texture: Stony sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Granitic colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

780F—Ovando, moist-Elkner, moist-Rock outcrop complex, 35 to 60 percent slopes

Setting

Landform:

- Ovando—Mountains
- Elkner—Mountains
- Rock outcrop—Mountains

Slope:

- Ovando—35 to 60 percent
- Elkner—35 to 60 percent

Elevation: 4,600 to 7,000 feet

Mean annual precipitation: 24 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Ovando and similar soils: 40 percent

Elkner and similar soils: 25 percent

Rock outcrop: 20 percent

Minor Components

Yreka soils: 0 to 8 percent

Soils that are shallow to bedrock: 0 to 7 percent

Major Component Description

Ovando

Surface layer texture: Extremely bouldery sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Excessively drained

Dominant parent material: Granitic colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 1.6 inches

Elkner

Surface layer texture: Bouldery sandy loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.6 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Perma Series

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Permeability: Moderate to the BC horizon, moderately rapid below

Landform: Mountains, alluvial fans, stream terraces, and outwash plains

Parent material: Alluvium

Slope range: 0 to 70 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Typic Haplustolls

Typical Pedon

Perma cobbly loam, 15 to 35 percent slopes, in an area of rangeland, 650 feet south and 300 feet east of the northwest corner of sec. 10, T. 9 N., R. 14 W.

A—0 to 7 inches; dark grayish brown (10YR 4/2) cobbly loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure parting to moderate fine granular; soft, very friable, slightly sticky, slightly plastic; many fine and very fine and common medium roots; 10 percent cobbles and 10 percent pebbles; slightly acid; clear smooth boundary.

Bw1—7 to 12 inches; dark grayish brown (10YR 4/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many fine and very fine and common medium roots; many very fine tubular pores; 10 percent cobbles and 40 percent pebbles; neutral; clear wavy boundary.

Bw2—12 to 20 inches; brown (10YR 5/3) very cobbly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and very fine and common medium roots; common fine and very fine tubular pores; 30 percent cobbles and 25 percent pebbles; neutral; clear wavy boundary.

BC—20 to 40 inches; reddish brown (5YR 5/4) extremely stony coarse sandy loam, reddish brown (5YR 4/4) moist; moderate fine subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; common fine and medium roots; 25 percent stones, 20 percent cobbles and 25 percent pebbles; neutral; clear wavy boundary.

C—40 to 60 inches; reddish brown (5YR 5/3) extremely cobbly coarse sandy loam; reddish brown (5YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; few very fine and medium roots; 10 percent stones, 35 percent cobbles and 30 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 44 to 47 degrees F

Moisture control section: Between 8 and 24 inches

Thickness of the mollic epipedon: 10 to 15 inches

A horizon

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 7 to 20 percent

Content of rock fragments: 15 to 35 percent—5 to 10 percent cobbles; 10 to 25 percent pebbles

Reaction: pH 6.1 to 7.3

Bw horizons

Hue: 10YR or 7.5YR

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 4

Clay content: 7 to 20 percent

Content of rock fragments: 35 to 75 percent—10 to 35 percent cobbles; 25 to 40 percent pebbles

Reaction: pH 6.6 to 7.8

BC horizon

Hue: 10YR or 7.5YR

Value: 4 to 7 dry; 3 to 5 moist

Chroma: 2 to 4

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

Clay content: 0 to 15 percent

Content of rock fragments: 60 to 85 percent—10 to 50 percent cobbles and stones; 50 to 65 percent pebbles

Reaction: pH 6.6 to 7.8

C horizon

Hue: 10YR or 7.5YR

Value: 4 to 7 dry; 3 to 5 moist

Chroma: 2 to 4

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

Clay content: 0 to 15 percent

Content of rock fragments: 60 to 75 percent—0 to 10 percent stones; 10 to 35 percent cobbles; 25 to 40 percent pebbles

Reaction: pH 6.6 to 7.8

41B—Perma gravelly loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 3,600 to 6,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Perma and similar soils: 85 percent

Minor Components

Shawmut and similar soils: 0 to 5 percent

Krutar and similar soils: 0 to 5 percent

Braziel and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

41C—Perma gravelly loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Toeslopes

Slope: 4 to 8 percent

Elevation: 3,600 to 6,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Perma and similar soils: 85 percent

Minor Components

Shawmut and similar soils: 0 to 5 percent

Krutar and similar soils: 0 to 5 percent

Braziel and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

41D—Perma gravelly loam, 8 to 15 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Perma and similar soils: 85 percent

Minor Components

Shawmut and similar soils: 0 to 5 percent
 Krutar and similar soils: 0 to 5 percent
 Braziel and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

41E—Perma gravelly loam, 15 to 35 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Perma and similar soils: 85 percent

Minor Components

Shawmut and similar soils: 0 to 5 percent
 Krutar and similar soils: 0 to 4 percent
 Areas of rock outcrop: 0 to 3 percent
 Braziel and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

41F—Perma gravelly loam, 35 to 60 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Perma and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 4 percent

Shawmut and similar soils: 0 to 4 percent

Krutar and similar soils: 0 to 4 percent

Braziel and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

41G—Perma gravelly loam, 60 to 80 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Backslopes and shoulders

Slope: 60 to 70 percent

Elevation: 3,600 to 6,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Perma and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 7 percent

Shawmut and similar soils: 0 to 3 percent

Krutar and similar soils: 0 to 3 percent

Braziel and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

241B—Perma stony loam, 0 to 4 percent slopes

Setting

Landform: Outwash plains

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 3,600 to 6,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Perma and similar soils: 85 percent

Minor Components

Dominic and similar soils: 0 to 8 percent

Sarbo and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Stony loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

338C—Perma cobbly loam, 4 to 8 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Perma and similar soils: 85 percent

Minor Components

Dominic and similar soils: 0 to 8 percent
 Wimper and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

338D—Perma cobbly loam, 8 to 15 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Perma and similar soils: 85 percent

Minor Components

Dominic and similar soils: 0 to 8 percent
 Wimper and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

338E—Perma cobbly loam, 15 to 35 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent
Elevation: 3,700 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Perma and similar soils: 85 percent

Minor Components

Dominic and similar soils: 0 to 8 percent
 Wimper and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

338F—Perma cobbly loam, 35 to 60 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Perma and similar soils: 85 percent

Minor Components

Dominic and similar soils: 0 to 8 percent
 Wimper and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

424B—Perma-Lone Rock complex, 2 to 4 percent slopes

Setting

Landform:

- Perma—Alluvial fans and stream terraces
- Lone Rock—Alluvial fans and stream terraces

Position on landform:

- Perma—Treads
- Lone Rock—Treads

Slope:

- Perma—2 to 4 percent
- Lone Rock—2 to 4 percent

Elevation: 3,600 to 6,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Perma and similar soils: 50 percent
 Lone Rock and similar soils: 35 percent

Minor Components

Sarbo and similar soils: 0 to 8 percent
 Straw and similar soils: 0 to 7 percent

Major Component Description

Perma

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.4 inches

Lone Rock

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

424C—Perma-Lone Rock complex, 4 to 8 percent slopes

Setting

Landform:

- Perma—Alluvial fans and stream terraces
- Lone Rock—Alluvial fans and stream terraces

Position on landform:

- Perma—Toeslopes
- Lone Rock—Toeslopes

Slope:

- Perma—4 to 8 percent
- Lone Rock—4 to 8 percent

Elevation: 3,600 to 6,000 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days**Composition****Major Components**

- Perma and similar soils: 50 percent
- Lone Rock and similar soils: 35 percent

Minor Components

- Sarbo and similar soils: 0 to 8 percent
- Straw and similar soils: 0 to 7 percent

Major Component Description**Perma**

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.4 inches

Lone Rock

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

738E—Perma-Whitlash complex, 15 to 35 percent slopes**Setting***Landform:*

- Perma—Mountains
- Whitlash—Mountains

Position on landform:

- Perma—Backslopes and footslopes
- Whitlash—Backslopes and footslopes

Slope:

- Perma—15 to 35 percent
- Whitlash—15 to 35 percent

Elevation: 3,600 to 6,200 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days**Composition****Major Components**

- Perma and similar soils: 50 percent
- Whitlash and similar soils: 35 percent

Minor Components

- Moderately deep soils: 0 to 5 percent
- Areas of rock outcrop: 0 to 5 percent
- Brazil and similar soils: 0 to 5 percent

Major Component Description**Perma**

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.4 inches

Whitlash

Surface layer texture: Very stony loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Quartzite residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

738F—Perma-Whitlash complex, 35 to 60 percent slopes**Setting***Landform:*

- Perma—Mountains
- Whitlash—Mountains

Position on landform:

- Perma—Backslopes and shoulders
- Whitlash—Backslopes and shoulders

Slope:

- Perma—35 to 60 percent
- Whitlash—35 to 60 percent

Elevation: 3,600 to 6,200 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days**Composition****Major Components**

Perma and similar soils: 50 percent

Whitlash and similar soils: 35 percent

Minor Components

Moderately deep soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Braziel and similar soils: 0 to 5 percent

Major Component Description**Perma***Surface layer texture:* Cobbly loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Somewhat excessively drained*Dominant parent material:* Alluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 3.4 inches**Whitlash***Surface layer texture:* Very stony loam*Depth class:* Shallow (10 to 20 inches)*Drainage class:* Well drained*Dominant parent material:* Quartzite residuum*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 1.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

838E—Perma-Whitlash-Rock outcrop complex, 15 to 35 percent slopes**Setting***Landform:*

- Perma—Mountains
- Whitlash—Mountains
- Rock outcrop—Mountains

Position on landform:

- Perma—Backslopes and footslopes
- Whitlash—Backslopes and footslopes
- Rock outcrop—Backslopes and footslopes

Slope:

- Perma—15 to 35 percent
- Whitlash—15 to 35 percent

Elevation: 3,600 to 6,200 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days**Composition****Major Components**

Perma and similar soils: 50 percent

Whitlash and similar soils: 20 percent

Rock outcrop: 15 percent

Minor Components

Braziel and similar soils: 0 to 8 percent

Moderately deep soils: 0 to 7 percent

Major Component Description**Perma***Surface layer texture:* Gravelly loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Somewhat excessively drained*Dominant parent material:* Alluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 3.4 inches**Whitlash***Surface layer texture:* Very stony loam*Depth class:* Shallow (10 to 20 inches)*Drainage class:* Well drained*Dominant parent material:* Quartzite residuum*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 1.2 inches**Rock outcrop***Definition:* Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

838F—Perma-Whitlash-Rock outcrop complex, 35 to 60 percent slopes

Setting

Landform:

- Perma—Mountains
- Whitlash—Mountains
- Rock outcrop—Mountains

Position on landform:

- Perma—Backslopes and shoulders
- Whitlash—Backslopes and shoulders
- Rock outcrop—Backslopes and shoulders

Slope:

- Perma—35 to 60 percent
- Whitlash—35 to 60 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Perma and similar soils: 50 percent
Whitlash and similar soils: 20 percent
Rock outcrop: 15 percent

Minor Components

Braziel and similar soils: 0 to 8 percent
Moderately deep soils: 0 to 7 percent

Major Component Description

Perma

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.4 inches

Whitlash

Surface layer texture: Very stony loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Quartzite residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.2 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

102A—Pits, gravel

Composition

Major Components

Pits, Gravelly: 85 percent

Major Component Description

Definition: Areas mined as a source of sand and gravel

Poronto Series

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly drained

Permeability: Moderate

Landform: Stream terraces and alluvial fans

Parent material: Alluvium

Slope range: 0 to 4 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 10 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 105 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Typic Endoaquolls

Typical Pedon

Poronto loam, 0 to 4 percent slopes, in an area of pasture, 1,900 feet north and 1,850 feet east of the southwest corner of sec. 33, T. 10 N., R. 13 W.

Oi—3 inches to 0; slightly decomposed organic matter.

A1—0 to 5 inches; black (10YR 2/1) loam, grayish brown (10YR 5/2) dry; strong coarse subangular blocky structure; hard, friable, moderately sticky, moderately plastic; many fine and very fine roots; common fine and very fine interstitial and few fine tubular pores; 5 percent pebbles; neutral; clear smooth boundary.

A2—5 to 14 inches; very dark gray (10YR 3/1) cobbly loam, gray (10YR 5/1) dry; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine and very fine roots; common fine and very fine interstitial and few fine tubular pores; 15 percent cobbles and 5 percent pebbles; slightly alkaline; clear wavy boundary.

Bg1—14 to 21 inches; dark gray (10YR 4/1) very cobbly loam, light gray (10YR 6/1) dry; many fine distinct yellowish red (5YR 5/8) redox concentrations; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few fine and very fine roots; common fine and very fine interstitial pores; 20 percent cobbles and 25 percent pebbles; slightly alkaline; clear wavy boundary.

Bg2—21 to 60 inches; reddish gray (5YR 5/2) extremely gravelly sandy loam, pinkish gray (7.5YR 6/2) dry; many fine distinct yellowish red (10YR 5/6) redox concentrations; weak fine subangular blocky structure; slightly hard, very friable; slightly sticky, slightly plastic; common fine and very fine interstitial and common medium tubular pores; 20 percent cobbles and 45 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 10 to 14 inches

Depth to the seasonal high water table: 12 to 24 inches

A1 horizon

Hue: 10YR or 2.5Y

Value: 2 or 3 moist; 2 to 5 dry

Chroma: 0 to 2

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 10 percent—0 to 5 percent cobbles; 0 to 5 percent pebbles

Reaction: pH 6.6 to 7.8

A2 horizon

Hue: 10YR or 2.5Y

Value: 2 or 3 moist; 2 to 5 dry

Chroma: 0 to 2

Texture: Loam, clay loam, or silty clay loam

Clay content: 18 to 35 percent

Content of rock fragments: 15 to 30 percent—15 to 20 percent cobbles; 0 to 10 percent pebbles

Reaction: pH 6.6 to 7.8

Bg1 horizon

Hue: 5YR to 5Y

Value: 3 or 4 moist; 5 to 7 dry

Chroma: 1 to 3

Texture: Clay loam, sandy clay loam, or loam

Clay content: 18 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

Bg2 horizon

Hue: 5YR to 5Y

Value: 3 to 5 moist; 5 to 7 dry

Chroma: 1 to 3

Texture: Sandy loam, loam, or sandy clay loam

Clay content: 15 to 30 percent

Content of rock fragments: 50 to 65 percent—10 to 20 percent cobbles; 40 to 45 percent pebbles

Reaction: pH 6.6 to 7.3

637B—Poronto loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 10 to 19 inches

Frost-free period: 70 to 105 days

Composition

Major Components

Poronto and similar soils: 85 percent

Minor Components

Flintcreek and similar soils: 0 to 4 percent

Blossberg and similar soils: 0 to 4 percent

Kleinschmidt and similar soils: 0 to 4 percent

Mannixlee and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Apparent

Available water capacity: Mainly 5.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Quigley Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Alluvial fans and stream terraces

Parent material: Calcareous alluvium

Slope range: 0 to 15 percent

Elevation range: 3,600 to 5,800 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Typic Haplustolls

Typical Pedon

Quigley loam, 4 to 8 percent slopes, in an area of cropland, 1,150 feet north and 100 feet east of the southwest corner of sec. 26, T. 11 N., R. 13 W.

A—0 to 7 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, moderately sticky, slightly plastic; many very fine roots; many fine and very fine irregular pores; neutral; clear smooth boundary.

Bw—7 to 21 inches; light brownish gray (2.5Y 6/2) loam, grayish brown (2.5Y 5/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine roots; many fine and very fine irregular pores; neutral; gradual wavy boundary.

Bk1—21 to 34 inches; pale yellow (2.5Y 8/4) silt loam, light yellowish brown (2.5Y 6/4) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots; many fine and very fine irregular pores; 5 percent pebbles; common fine masses of lime; violently effervescent; strongly alkaline; gradual wavy boundary.

Bk2—34 to 60 inches; pale yellow (2.5Y 7/4) silt loam, light olive brown (2.5Y 5/4) moist; weak fine subangular blocky structure; slightly hard, friable, moderately sticky, slightly plastic; common very fine roots; many fine and very fine irregular pores; 10 percent pebbles; common fine masses of lime; violently effervescent; strongly alkaline.

Range in Characteristics

Soil temperature: 40 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

A horizon

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 20 to 27 percent

Reaction: pH 6.6 to 7.3

Bw horizon

Value: 4 to 6 dry

Texture: Loam or clay loam

Clay content: 18 to 33 percent

Reaction: pH 6.6 to 7.8

Bk1 horizon

Value: 6 to 8 dry

Texture: Loam, silt loam, or clay loam

Clay content: 15 to 30 percent

Content of rock fragments: 5 to 15 percent pebbles

Calcium carbonate equivalent: 15 to 40 percent

Reaction: pH 7.9 to 9.0

Bk2 horizon

Value: 7 or 8 dry; 5 to 7 moist

Chroma: 1 to 4

Texture: Loam, silt loam, or clay loam

Clay content: 15 to 30 percent

Content of rock fragments: 5 to 15 percent pebbles

Calcium carbonate equivalent: 15 to 35 percent

Reaction: pH 8.5 to 9.0

60B—Quigley loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Toeslopes

Slope: 0 to 4 percent

Elevation: 3,600 to 5,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Quigley and similar soils: 85 percent

Minor Components

Danvers and similar soils: 0 to 5 percent

Martinsdale and similar soils: 0 to 5 percent

Shawmut and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

60C—Quigley loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Toeslopes

Slope: 4 to 8 percent

Elevation: 3,600 to 5,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Quigley and similar soils: 85 percent

Minor Components

Danvers and similar soils: 0 to 5 percent

Martinsdale and similar soils: 0 to 5 percent

Shawmut and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

60D—Quigley loam, 8 to 15 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Footslopes and toeslopes

Slope: 8 to 15 percent

Elevation: 3,600 to 5,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Quigley and similar soils: 85 percent

Minor Components

Danvers and similar soils: 0 to 5 percent

Martinsdale and similar soils: 0 to 5 percent

Shawmut and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Redchief Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Slow

Landform: Mountains

Parent material: Colluvium derived from igneous bedrock

Slope range: 4 to 60 percent

Elevation range: 5,800 to 7,000 feet

Annual precipitation: 15 to 22 inches

Annual air temperature: 34 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Clayey-skeletal, smectitic Ustic Argicryolls

Typical Pedon

Redchief cobbly loam, 15 to 35 percent slopes, in an area of rangeland, 200 feet north and 700 feet west of the southeast corner of sec. 12, T. 7 N., R. 15 W.

A1—0 to 6 inches; very dark grayish brown (10YR 3/2) cobbly loam, very dark brown (10YR 2/2) moist; moderate fine subangular blocky structure; soft, very friable, nonsticky, slightly plastic; many

very fine roots; common very fine tubular pores; 15 percent cobbles and 10 percent pebbles; neutral; clear smooth boundary.

A2—6 to 10 inches; brown (10YR 4/3) very gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; many very fine roots; common very fine tubular pores; 15 percent cobbles and 30 percent pebbles; neutral; clear smooth boundary.

Bt1—10 to 17 inches; brown (7.5YR 5/4) very cobbly clay loam, dark brown (7.5YR 4/4) moist; moderate fine subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; many very fine roots; many very fine tubular pores; many faint clay films on faces of peds; 25 percent cobbles and 25 percent pebbles; neutral; gradual wavy boundary.

Bt2—17 to 28 inches; strong brown (7.5YR 5/6) very cobbly clay loam, brown (7.5YR 5/4) moist; moderate fine subangular blocky structure; very hard, friable, moderately sticky, moderately plastic; common very fine roots; few very fine tubular pores; common faint clay films on faces of peds; 25 percent cobbles and 25 percent pebbles; neutral; gradual wavy boundary.

Bt3—28 to 60 inches; brown (7.5YR 5/4) very cobbly clay loam; dark brown (7.5YR 4/4) moist; moderate fine subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; few very fine roots; common faint clay films on faces of peds; 30 percent cobbles and 25 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 36 to 45 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 10 to 16 inches

A1 horizon

Hue: 10YR or 7.5YR

Value: 2 to 4 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 20 to 27 percent

Content of rock fragments: 15 to 30 percent—
10 to 20 percent cobbles; 5 to 10 percent pebbles

Reaction: pH 5.1 to 7.3

A2 horizon

Hue: 10YR or 7.5YR

Value: 2 to 4 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 20 to 27 percent

Content of rock fragments: 40 to 60 percent—
15 to 30 percent cobbles; 25 to 30 percent pebbles

Reaction: pH 5.1 to 7.3

Bt horizons

Hue: 10YR to 5YR

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 3 to 8

Texture: Clay loam or clay

Clay content: 35 to 60 percent

Content of rock fragments: 40 to 60 percent—
15 to 30 percent cobbles; 25 to 30 percent pebbles

Reaction: pH 5.1 to 7.3

45D—Redchief cobbly loam, 4 to 15 percent slopes

Setting

Landform: Mountains

Position on landform: Footslopes and toeslopes

Slope: 4 to 15 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Redchief and similar soils: 85 percent

Minor Components

Mollet and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Libeg and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

45E—Redchief cobbly loam, 15 to 35 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Redchief and similar soils: 85 percent

Minor Components

Mollet and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Libeg and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Igneous colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

45F—Redchief cobbly loam, 35 to 60 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and shoulders

Slope: 35 to 60 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Redchief and similar soils: 85 percent

Minor Components

Mollet and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Libeg and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Igneous colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

145C—Redchief-Mollet complex, 4 to 8 percent slopes

Setting

Landform:

- Redchief—Mountains

- Mollet—Mountains

Position on landform:

- Redchief—Toeslopes

- Mollet—Toeslopes

Slope:

- Redchief—4 to 8 percent

- Mollet—4 to 8 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Redchief and similar soils: 50 percent

Mollet and similar soils: 35 percent

Minor Components

Libeg and similar soils: 0 to 8 percent

Maciver and similar soils: 0 to 7 percent

Major Component Description

Redchief

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained
Dominant parent material: Igneous colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

Mollet

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

145D—Redchief-Mollet complex, 8 to 15 percent slopes**Setting**

Landform:

- Redchief—Mountains
- Mollet—Mountains

Position on landform:

- Redchief—Foothills and toeslopes
- Mollet—Foothills and toeslopes

Slope:

- Redchief—8 to 15 percent
- Mollet—8 to 15 percent

Elevation: 5,800 to 7,000 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Composition**Major Components**

Redchief and similar soils: 50 percent
Mollet and similar soils: 35 percent

Minor Components

Libeg and similar soils: 0 to 8 percent
Maciver and similar soils: 0 to 7 percent

Major Component Description**Redchief**

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained

Dominant parent material: Igneous colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.5 inches

Mollet

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

145E—Redchief-Mollet complex, 15 to 35 percent slopes**Setting**

Landform:

- Redchief—Mountains
- Mollet—Mountains

Position on landform:

- Redchief—Backslopes and footslopes
- Mollet—Backslopes and footslopes

Slope:

- Redchief—15 to 35 percent
- Mollet—15 to 35 percent

Elevation: 5,800 to 7,000 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Composition**Major Components**

Redchief and similar soils: 50 percent
Mollet and similar soils: 35 percent

Minor Components

Libeg and similar soils: 0 to 8 percent
Maciver and similar soils: 0 to 7 percent

Major Component Description**Redchief**

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Igneous colluvium

Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.5 inches

Mollet

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

145F—Redchief-Mollet complex, 35 to 60 percent slopes

Setting

Landform:

- Redchief—Mountains
- Mollet—Mountains

Position on landform:

- Redchief—Backslopes and shoulders
- Mollet—Backslopes and shoulders

Slope:

- Redchief—35 to 60 percent
- Mollet—35 to 60 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Redchief and similar soils: 50 percent
 Mollet and similar soils: 35 percent

Minor Components

Libeg and similar soils: 0 to 8 percent
 Maciver and similar soils: 0 to 7 percent

Major Component Description

Redchief

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained

Dominant parent material: Igneous colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.5 inches

Mollet

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Relyea Series

Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Permeability: Moderately slow
Landform: Mountains
Parent material: Colluvium derived from limestone
Slope range: 8 to 60 percent
Elevation range: 4,600 to 7,500 feet
Annual precipitation: 20 to 30 inches
Annual air temperature: 35 to 38 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Clayey-skeletal, mixed, superactive Eutric Glossocryalfs

Typical Pedon

Relyea gravelly loam, in an area of Relyea-Helmville complex, 8 to 15 percent slopes, in an area of woodland, 1,200 feet north and 600 feet west of the southeast corner of sec. 28, T. 12 N., R. 13 W.

Oi—1 inch to 0; decomposed forest litter.
 E—0 to 5 inches; very pale brown (10YR 7/3) gravelly loam, brown (10YR 4/3) moist; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine tubular pores; 15 percent pebbles; neutral; clear smooth boundary.
 Bt/E—5 to 8 inches; B part (85 percent), is brown (10YR 5/3) gravelly clay loam, brown (10YR 4/3)

moist, E part (15 percent) is very pale brown (10YR 7/3) gravelly loam, dark yellowish brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, firm, moderately sticky, moderately plastic; many very fine and fine roots; many very fine tubular pores; 5 percent cobbles and 15 percent pebbles; neutral; clear smooth boundary.

Bt1—8 to 15 inches; yellowish brown (10YR 5/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; strong medium subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; many very fine roots; common very fine tubular pores; many faint clay films on faces of peds; 10 percent cobbles and 30 percent pebbles; neutral; clear smooth boundary.

Bt2—15 to 26 inches; yellowish brown (10YR 5/6) very gravelly clay loam, dark yellowish brown (10YR 4/6) moist; moderate medium subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; many very fine roots; common very fine tubular pores; many faint clay films on faces of peds; 15 percent cobbles and 30 percent pebbles; neutral; clear smooth boundary.

Bt3—26 to 40 inches; red (2.5YR 5/6) very gravelly clay loam, reddish brown (2.5YR 4/4) moist; moderate fine subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; many very fine roots; common very fine tubular pores; many faint clay films on faces of peds; 20 percent cobbles and 30 percent pebbles; neutral; clear smooth boundary.

Btk—40 to 45 inches; reddish brown (2.5YR 4/4) very cobbly clay loam, reddish brown (2.5YR 4/4) moist; moderate fine subangular blocky structure; very hard, firm, slightly sticky, moderately plastic; many very fine roots; common very fine tubular pores; few faint clay films on faces of peds; 20 percent cobbles and 25 percent pebbles; few fine masses of lime; slightly effervescent; slightly alkaline; clear smooth boundary.

Bk—45 to 60 inches; light reddish brown (5YR 6/3) very cobbly loam, reddish brown (5YR 4/3) moist; moderate fine subangular blocky structure; hard, friable, slightly sticky, moderately plastic; common very fine roots; few very fine interstitial pores; 25 percent cobbles and 25 percent pebbles; few fine masses of lime; strongly effervescent; slightly alkaline.

Range in Characteristics

Soil temperature: 37 to 40 degrees F

Moisture control section: Between 4 and 12 inches

E horizon

Value: 6 or 7 dry; 3 to 5 moist

Chroma: 2 or 3

Clay content: 20 to 27 percent

Content of rock fragments: 15 to 35 percent—0 to 10 stones and cobbles; 15 to 25 percent pebbles

Reaction: 6.1 to 7.3

Bt/E horizon

Value: B part—4 or 5 dry, 3 or 4 moist; E part—5 to 7 dry, 4 or 5 moist

Chroma: B part—2 to 6; E part—2 or 3

Texture: Clay loam or silty clay loam (mixed)

Clay content: 27 to 35 percent (mixed)

Content of rock fragments: 15 to 45 percent—5 to 15 percent stones and cobbles; 10 to 30 percent pebbles

Reaction: 6.1 to 7.3

Bt1 horizon

Hue: 10YR to 2.5YR

Value: 4 or 5 dry; 3 or 4 moist

Chroma: 2 to 6

Texture: Clay or clay loam

Clay content: 35 to 50 percent

Content of rock fragments: 35 to 60 percent—5 to 20 percent stones and cobbles; 30 to 40 percent pebbles

Reaction: 6.1 to 7.3

Bt2 horizon

Hue: 10YR to 5YR

Value: 4 to 6 dry; 3 or 4 moist

Chroma: 2 to 6

Texture: Clay or clay loam

Clay content: 35 to 50 percent

Content of rock fragments: 35 to 60 percent—5 to 20 percent stones and cobbles; 30 to 40 percent pebbles

Reaction: 6.1 to 7.3

Bt3 horizon

Hue: 10YR to 2.5YR

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 to 6

Texture: Clay or clay loam

Clay content: 35 to 50 percent

Content of rock fragments: 35 to 60 percent—5 to 20 percent stones and cobbles; 30 to 40 percent pebbles

Reaction: 6.1 to 7.3

Btk horizon

Hue: 10YR to 2.5YR

Value: 4 or 6 dry; 4 or 5 moist

Chroma: 2 to 6

Texture: Clay or clay loam
 Clay content: 27 to 45 percent
 Content of rock fragments: 35 to 60 percent—
 10 to 20 percent stones and cobbles; 25 to
 40 percent pebbles
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: 7.4 to 8.4

Bk horizon

Hue: 10YR or 5YR
 Value: 6 or 7 dry; 4 or 5 moist
 Chroma: 2 to 6
 Texture: Loam or clay loam
 Clay content: 18 to 30 percent
 Content of rock fragments: 40 to 70 percent—
 15 to 30 percent stones and cobbles; 25 to
 40 percent pebbles
 Calcium carbonate equivalent: 15 to 40 percent
 Reaction: 7.4 to 8.4

**185D—Relyea-Helmville complex, 8 to 15
 percent slopes**

Setting

Landform:

- Relyea—Mountains
- Helmville—Mountains

Position on landform:

- Relyea—Foothills and toeslopes
- Helmville—Foothills and toeslopes

Slope:

- Relyea—8 to 15 percent
- Helmville—8 to 15 percent

Elevation: 4,600 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Relyea and similar soils: 55 percent
 Helmville and similar soils: 30 percent

Minor Components

Danaher and similar soils: 0 to 5 percent
 Worock and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent

Major Component Description

Relyea

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone colluvium
Native plant cover type: Forest land

Flooding: None
Available water capacity: Mainly 4.9 inches

Helmville

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

**185E—Relyea-Helmville complex, 15 to 35
 percent slopes**

Setting

Landform:

- Relyea—Mountains
- Helmville—Mountains

Position on landform:

- Relyea—Backslopes and foothills
- Helmville—Backslopes and foothills

Slope:

- Relyea—15 to 35 percent
- Helmville—15 to 35 percent

Elevation: 4,600 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Relyea and similar soils: 55 percent
 Helmville and similar soils: 30 percent

Minor Components

Danaher and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent
 Worock and similar soils: 0 to 5 percent

Major Component Description

Relyea

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone colluvium
Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.9 inches

Helmville

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

185F—Relyea-Helmville complex, 15 to 35 percent slopes

Setting

Landform:

- Relyea—Mountains
- Helmville—Mountains

Position on landform:

- Relyea—Backslopes and footslopes
- Helmville—Backslopes and footslopes

Slope:

- Relyea—35 to 60 percent
- Helmville—35 to 60 percent

Elevation: 4,600 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Relyea and similar soils: 55 percent
Helmville and similar soils: 30 percent

Minor Components

Danaher and similar soils: 0 to 5 percent
Areas of rock outcrop: 0 to 5 percent
Worock and similar soils: 0 to 5 percent

Major Component Description

Relyea

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.9 inches

Helmville

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

485D—Relyea-Helmville complex, moist, 8 to 15 percent slopes

Setting

Landform:

- Relyea—Mountains
- Helmville—Mountains

Position on landform:

- Relyea—Footslopes and toeslopes
- Helmville—Footslopes and toeslopes

Slope:

- Relyea—8 to 15 percent
- Helmville—8 to 15 percent

Elevation: 4,600 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Relyea and similar soils: 55 percent
Helmville and similar soils: 30 percent

Minor Components

Danaher and similar soils: 0 to 5 percent
Areas of rock outcrop: 0 to 5 percent
Worock and similar soils: 0 to 5 percent

Major Component Description

Relyea

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.2 inches

Helmville

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

485E—Relyea-Helmville complex, moist, 15 to 35 percent slopes

Setting

Landform:

- Relyea—Mountains
- Helmville—Mountains

Position on landform:

- Relyea—Backslopes and footslopes
- Helmville—Backslopes and footslopes

Slope:

- Relyea—15 to 35 percent
- Helmville—15 to 35 percent

Elevation: 4,600 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Relyea and similar soils: 55 percent

Helmville and similar soils: 30 percent

Minor Components

Danaher and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Worock and similar soils: 0 to 5 percent

Major Component Description

Relyea

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.2 inches

Helmville

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

485F—Relyea-Helmville complex, moist, 35 to 60 percent slopes

Setting

Landform:

- Relyea—Mountains
- Helmville—Mountains

Position on landform:

- Relyea—Backslopes and shoulders
- Helmville—Backslopes and shoulders

Slope:

- Relyea—35 to 60 percent
- Helmville—35 to 60 percent

Elevation: 4,600 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Relyea and similar soils: 55 percent

Helmville and similar soils: 30 percent

Minor Components

Danaher and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Worock and similar soils: 0 to 5 percent

Major Component Description

Relyea

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.2 inches

Helmsville

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Rochester Series

Depth class: Very deep (more than 60 inches)

Drainage class: Excessively drained

Permeability: Rapid

Landform: Mountains

Parent material: Material weathered from intrusive igneous rocks

Slope range: 4 to 80 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 18 to 22 inches

Annual air temperature: 38 to 42 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Sandy-skeletal, mixed, frigid Typic Ustorthents

Typical Pedon

Rochester very stony loamy sand, in an area of Ambrant-Rochester complex, 15 to 35 percent slopes, in an area of woodland, 200 feet south and 1,300 feet east of the northwest corner of sec. 1, T. 12 N., R. 14 W.

Oi—1 inch to 0; partially decomposed forest litter.

A—0 to 3 inches; gray (10YR 5/1) very stony loamy sand, dark gray (10YR 4/1) moist; moderate medium granular structure; soft, very friable, nonsticky, nonplastic; many very fine and fine roots; few very fine irregular pores; 20 percent stones, 5 percent cobbles and 20 percent pebbles; neutral (pH 7.0); gradual wavy boundary.

C1—3 to 18 inches; gray (10YR 6/1) very stony loamy coarse sand, dark gray (10YR 4/1) moist; weak

fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; many very fine and fine roots; few very fine irregular pores; 20 percent stones, 20 percent cobbles and 15 percent pebbles; neutral (pH 7.0); gradual wavy boundary.
C2—18 to 60 inches; light gray (10YR 7/1) very stony loamy coarse sand, gray (10YR 5/1) moist; massive; soft, very friable, nonsticky, nonplastic; many very fine roots; few very fine irregular pores; 20 percent stones, 20 percent cobbles and 15 percent pebbles; neutral (pH 7.0).

Range in Characteristics

Soil temperature: 40 to 47 degrees F

Moisture control section: Between 12 and 35 inches

A horizon

Hue: 10YR or 2.5Y

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 1 to 3

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

Clay content: 0 to 10 percent

Content of rock fragments: 35 to 60 percent—10 to 20 stones; 5 to 10 percent cobbles; 20 to 30 percent pebbles

Reaction: 6.6 to 7.3

C1 horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 4 to 6 moist

Chroma: 1 to 3

Texture: Loamy coarse sand, sand, or coarse sandy loam

Clay content: 0 to 10 percent

Content of rock fragments: 40 to 70 percent—5 to 20 percent stones; 20 to 30 percent cobbles; 15 to 20 percent pebbles

Reaction: 6.6 to 7.3

C2 horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 4 to 6 moist

Chroma: 1 to 3

Texture: Loamy coarse sand or sand

Clay content: 0 to 10 percent

Content of rock fragments: 40 to 70 percent—5 to 20 percent stones, 20 to 30 percent cobbles; 15 to 20 percent pebbles

Reaction: 6.6 to 7.8

Rothiemay Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderately slow
Landform: Alluvial fans and stream terraces
Parent material: Calcareous alluvium
Slope range: 2 to 15 percent
Elevation range: 3,600 to 5,200 feet
Annual precipitation: 10 to 14 inches
Annual air temperature: 39 to 44 degrees F
Frost-free period: 90 to 105 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Aridic Calcistolls

Typical Pedon

Rothiemay loam, 2 to 4 percent slopes, in an area of rangeland, 1,700 feet south and 1,250 feet east of the northwest corner of sec. 12, T. 9 N., R. 13 W.

- A1—0 to 4 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; slightly alkaline; clear smooth boundary.
- A2—4 to 6 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure parting to moderate fine granular; soft, very friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; many very fine tubular pores; strongly effervescent; slightly alkaline; clear wavy boundary.
- Bw—6 to 9 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; common very fine and fine tubular pores; violently effervescent; slightly alkaline; clear wavy boundary.
- Bk1—9 to 20 inches; white (10YR 8/2) loam, very pale brown (10YR 7/4) moist; weak coarse subangular blocky structure; hard, firm, slightly sticky, slightly plastic; common very fine, fine, and medium roots; common fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.
- Bk2—20 to 60 inches; very pale brown (10YR 8/3) loam, very pale brown (10YR 7/4) moist; weak fine subangular blocky structure; hard, firm, slightly sticky, slightly plastic; few fine and very fine roots; 5 percent pebbles; common fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F
Moisture control section: Between 4 and 12 inches
Thickness of the mollic epipedon: 7 to 10 inches

A1 horizon

Hue: 10YR or 2.5Y
 Value: 4 or 5 moist
 Chroma: 1 or 2
 Clay content: 15 to 27 percent
 Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles
 Reaction: pH 7.4 to 8.4

A2 horizon

Hue: 10YR or 2.5Y
 Value: 4 or 5 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
 Calcium carbonate equivalent: 5 to 10 percent
 Reaction: pH 7.4 to 8.4

Bw horizon

Hue: 10YR or 2.5Y
 Value: 5 to 7 dry; 4 or 5 moist
 Chroma: 2 or 3
 Texture: Loam or clay loam
 Clay content: 20 to 35 percent
 Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: pH 7.4 to 8.4

Bk1 horizon

Hue: 10YR or 2.5Y
 Value: 5 to 7 dry; 4 or 5 moist
 Chroma: 2 or 3
 Texture: Loam or clay loam
 Clay content: 20 to 35 percent
 Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles
 Calcium carbonate equivalent: 15 to 20 percent
 Reaction: pH 7.9 to 8.4

Bk2 horizon

Hue: 10YR or 2.5Y
 Value: 5 to 7 dry; 4 or 5 moist
 Chroma: 2 or 3
 Texture: Loam or clay loam
 Clay content: 18 to 35 percent
 Content of rock fragments: 5 to 30 percent—0 to 5 percent cobbles; 5 to 25 percent pebbles

Calcium carbonate equivalent: 15 to 60 percent
Reaction: pH 7.9 to 9.0

33B—Rothiemay loam, 2 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 2 to 4 percent
Elevation: 3,600 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Composition

Major Components

Rothiemay and similar soils: 85 percent

Minor Components

Con and similar soils: 0 to 7 percent
Anaconda and similar soils: 0 to 5 percent
Straw and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

33C—Rothiemay loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 3,600 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Composition

Major Components

Rothiemay and similar soils: 85 percent

Minor Components

Con and similar soils: 0 to 7 percent
Anaconda and similar soils: 0 to 5 percent
Straw and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

33D—Rothiemay loam, 8 to 15 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 3,600 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Composition

Major Components

Rothiemay and similar soils: 85 percent

Minor Components

Con and similar soils: 0 to 9 percent
Anaconda and similar soils: 0 to 4 percent
Straw and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Roundor Series

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Moderately slow

Landform: Hills and sedimentary plains

Parent material: Material derived from interbedded sandstone and siltstone

Slope range: 2 to 35 percent

Elevation range: 3,600 to 5,400 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 38 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Typic Calcicustolls

Typical Pedon

Roundor loam, 15 to 35 percent slopes, in an area of rangeland, 1,900 feet south and 1,300 feet west of the northeast corner of sec. 13, T. 9 N., R. 13 W.

A—0 to 6 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure parting to moderate fine granular; soft, very friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; 10 percent channers; slightly effervescent; neutral; clear smooth boundary.

Bw—6 to 12 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and few fine roots; 10 percent channers; strongly effervescent; moderately alkaline; gradual smooth boundary.

Bk1—12 to 25 inches; very pale brown (10YR 7/3) channery loam, pale brown (10YR 6/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and few fine roots; 10 percent

channers and 5 percent flagstones; few medium masses of lime; violently effervescent; moderately alkaline; gradual smooth boundary.

Bk2—25 to 38 inches; very pale brown (10YR 7/4) stony clay loam; light yellowish brown (10YR 6/4) moist; moderate medium subangular blocky structure; slightly hard, friable, moderately sticky, moderately plastic; common very fine and few fine roots; 10 percent channers, 10 percent flagstones, and 10 percent stones; few fine masses of lime; violently effervescent; moderately alkaline; clear wavy boundary.

Cr—38 to 60 inches; very pale brown (10YR 7/4) weakly consolidated sedimentary beds that crush to clay loam.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 10 inches

Depth to the Bk horizon: 6 to 10 inches

A horizon

Hue: 7.5YR to 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: 0 to 15 percent channers

Calcium carbonate equivalent: 5 to 10 percent

Reaction: pH 6.6 to 7.8

Bw horizon

Hue: 7.5YR to 2.5Y

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 or 3

Texture: Loam, silt loam, silty clay loam, or clay loam

Clay content: 20 to 35 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent flagstones; 0 to 10 percent channers

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4

Bk1 horizon

Hue: 7.5YR to 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 or 3

Texture: Loam, silt loam, silty clay loam, or clay loam

Clay content: 20 to 35 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent flagstones; 0 to 10 percent channers

Calcium carbonate equivalent: 15 to 35 percent

Reaction: pH 7.9 to 8.4

Bk2 horizon

Hue: 7.5YR to 2.5Y
 Value: 5 to 7 dry; 4 to 6 moist
 Chroma: 2 to 4
 Texture: Loam, silt loam, or clay loam
 Clay content: 20 to 35 percent
 Content of rock fragments: 0 to 35 percent—0 to 15 percent channers; 0 to 10 percent flagstones; 0 to 10 percent stones
 Calcium carbonate equivalent: 15 to 35 percent
 Reaction: pH 7.4 to 8.4

44B—Roundor loam, 2 to 4 percent slopes**Setting**

Landform: Sedimentary plains
Position on landform: Toeslopes
Slope: 2 to 4 percent
Elevation: 3,600 to 5,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Roundor and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
 Rothiemay and similar soils: 0 to 5 percent
 Boxwell and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Interbedded siltstone and sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

44C—Roundor loam, 4 to 8 percent slopes**Setting**

Landform: Hills
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 3,600 to 5,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Roundor and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
 Boxwell and similar soils: 0 to 5 percent
 Rothiemay and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Interbedded siltstone and sandstone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

44D—Roundor loam, 8 to 15 percent slopes**Setting**

Landform: Hills
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 3,600 to 5,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Roundor and similar soils: 85 percent

Minor Components

Rothiemay and similar soils: 0 to 5 percent

Boxwell and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Interbedded siltstone and sandstone residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

44E—Roundor loam, 15 to 35 percent slopes

Setting

Landform: Hills

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Roundor and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Rothiemay and similar soils: 0 to 5 percent

Boxwell and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Interbedded siltstone and sandstone residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

440D—Roundor-Lap complex, 8 to 15 percent slopes

Setting

Landform:

- Roundor—Hills
- Lap—Hills

Position on landform:

- Roundor—Footslopes and toeslopes
- Lap—Footslopes and toeslopes

Slope:

- Roundor—8 to 15 percent
- Lap—8 to 15 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Roundor and similar soils: 55 percent

Lap and similar soils: 30 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Boxwell and similar soils: 0 to 5 percent

Rothiemay and similar soils: 0 to 5 percent

Major Component Description

Roundor

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Interbedded siltstone and sandstone residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.5 inches

Lap

Surface layer texture: Gravelly loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Limestone residuum

Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

440E—Roundor-Lap complex, 15 to 35 percent slopes

Setting

Landform:

- Roundor—Hills
- Lap—Hills

Position on landform:

- Roundor—Backslopes and footslopes
- Lap—Backslopes and footslopes

Slope:

- Roundor—15 to 35 percent
- Lap—15 to 35 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Roundor and similar soils: 55 percent

Lap and similar soils: 30 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Boxwell and similar soils: 0 to 5 percent

Rothiemay and similar soils: 0 to 5 percent

Major Component Description

Roundor

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Interbedded siltstone and sandstone residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.5 inches

Lap

Surface layer texture: Gravelly loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Limestone residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Roy Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderately slow

Landform: Mountains, hills, alluvial fans, and stream terraces

Parent material: Alluvium and material derived from extrusive igneous rocks

Slope range: 0 to 60 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Clayey-skeletal, mixed, superactive, frigid Typic Argiustolls

Typical Pedon

Roy loam, in an area of Roy-Tolbert-Danvers complex, 8 to 15 percent slopes, in an area of rangeland, 2,400 feet south and 400 feet west of the northeast corner of sec. 5, T. 10 N., R. 13 W.

A—0 to 9 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure parting to moderate fine granular; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine tubular pores; 10 percent pebbles; neutral; clear smooth boundary.

Bt1—9 to 14 inches; dark grayish brown (10YR 4/2) very cobbly clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; hard, firm, very sticky, moderately plastic; many very fine and fine and few medium roots; common very fine tubular pores; few faint clay films on faces of peds; 20 percent cobbles and 25 percent pebbles; neutral; clear wavy boundary.

Bt2—14 to 23 inches; brown (10YR 5/3) very cobbly clay loam, dark brown (10YR 4/3) moist; strong medium subangular blocky structure; very hard, very firm, very sticky, moderately plastic; common fine and very fine roots; common very fine tubular pores; common faint clay films on faces of peds; 20 percent cobbles and 30 percent pebbles; neutral; clear wavy boundary.

Bt3—23 to 38 inches; brown (10YR 5/3) very cobbly clay; dark brown (10YR 4/3) moist; strong coarse subangular blocky structure; very hard, very firm, very sticky, moderately plastic; few fine and very fine roots; few very fine tubular pores; few faint clay films on faces of peds; 20 percent cobbles and 35 percent pebbles; neutral; clear smooth boundary.

BcK—38 to 60 inches; white (10YR 8/2) very cobbly clay loam; light gray (10YR 7/1) moist; massive; hard, firm, moderately sticky, moderately plastic; few fine and very fine roots; many very fine and common fine tubular pores; 20 percent cobbles and 30 percent pebbles; few fine masses and seams of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 40 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 10 to 14 inches

Depth to the BcK horizon: 20 to 40 inches

A horizon

Hue: 10YR or 7.5YR

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 15 to 27 percent

Content of rock fragments: 5 to 35 percent—0 to 10 percent cobbles; 5 to 25 percent pebbles

Reaction: pH 6.1 to 7.8

Bt1 horizon

Hue: 10YR or 7.5YR

Value: 4 or 5 dry; 3 or 4 moist

Chroma: 2 to 4

Texture: Clay loam or clay

Clay content: 35 to 50 percent

Content of rock fragments: 35 to 80 percent—20 to 50 percent cobbles; 15 to 30 percent pebbles

Reaction: pH 6.6 to 7.8

Bt2 and Bt3 horizons

Hue: 10YR or 7.5YR

Value: 4 or 5 dry; 3 or 4 moist

Chroma: 2 to 4

Texture: Clay loam or clay

Clay content: 35 to 50 percent

Content of rock fragments: 35 to 80 percent—20 to 50 percent cobbles; 15 to 30 percent pebbles

Reaction: pH 6.6 to 7.8

BcK horizon

Hue: 7.5YR to 2.5Y

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 3, 4, or 6

Texture: Clay loam or sandy clay loam

Clay content: 27 to 40 percent

Content of rock fragments: 35 to 80 percent—20 to 50 percent cobbles; 15 to 30 percent pebbles

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.9 to 8.4

17E—Roy-Carett-Elflint complex, 15 to 35 percent slopes

Setting

Landform:

- Roy—Alluvial fans and stream terraces
- Carett—Alluvial fans and stream terraces
- Elflint—Alluvial fans and stream terraces

Position on landform:

- Roy—Backslopes and footslopes
- Carett—Backslopes and footslopes
- Elflint—Backslopes and footslopes

Slope:

- Roy—15 to 35 percent
- Carett—15 to 35 percent
- Elflint—15 to 35 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Roy and similar soils: 35 percent

Carett and similar soils: 25 percent

Elflint and similar soils: 25 percent

Minor Components

Donald and similar soils: 0 to 8 percent

Shanley and similar soils: 0 to 7 percent

Major Component Description

Roy

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

Carett

Surface layer texture: Very cobbly clay
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Tuff residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.8 inches

Elflint

Surface layer texture: Loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Tuff residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

46B—Roy loam, 0 to 4 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 0 to 4 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Roy and similar soils: 85 percent

Minor Components

Danvers and similar soils: 0 to 5 percent
 Shawmut and similar soils: 0 to 5 percent
 Fergus and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)

Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

46C—Roy loam, 4 to 8 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Roy and similar soils: 85 percent

Minor Components

Danvers and similar soils: 0 to 5 percent
 Shawmut and similar soils: 0 to 5 percent
 Fergus and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

46D—Roy loam, 8 to 15 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Roy and similar soils: 85 percent

Minor Components

Danvers and similar soils: 0 to 5 percent
 Shawmut and similar soils: 0 to 5 percent
 Fergus and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

46E—Roy loam, 15 to 35 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Roy and similar soils: 85 percent

Minor Components

Danvers and similar soils: 0 to 5 percent
 Shawmut and similar soils: 0 to 5 percent
 Fergus and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

46F—Roy loam, 35 to 60 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Roy and similar soils: 85 percent

Minor Components

Danvers and similar soils: 0 to 5 percent
 Shawmut and similar soils: 0 to 5 percent
 Fergus and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

146B—Roy cobbly loam, 2 to 4 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 2 to 4 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Roy and similar soils: 85 percent

Minor Components

Shanley and similar soils: 0 to 5 percent
 Danvers and similar soils: 0 to 5 percent
 Shawmut and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

146C—Roy cobbly loam, 4 to 8 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Roy and similar soils: 85 percent

Minor Components

Shanley and similar soils: 0 to 5 percent
 Danvers and similar soils: 0 to 5 percent
 Shawmut and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

146D—Roy cobbly loam, 8 to 15 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Roy and similar soils: 85 percent

Minor Components

Shanley and similar soils: 0 to 5 percent
 Danvers and similar soils: 0 to 5 percent
 Shawmut and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

146E—Roy cobbly loam, 15 to 35 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Roy and similar soils: 85 percent

Minor Components

Shanley and similar soils: 0 to 5 percent
 Danvers and similar soils: 0 to 5 percent
 Shawmut and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

246D—Roy stony loam, 8 to 15 percent slopes

Setting

Landform: Mountains
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Roy and similar soils: 85 percent

Minor Components

Danvers and similar soils: 0 to 8 percent
 Shawmut and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Stony loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

246E—Roy stony loam, 15 to 35 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Roy and similar soils: 85 percent

Minor Components

Shawmut and similar soils: 0 to 8 percent
 Danvers and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Stony loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

351D—Roy-Shawmut-Danvers complex, 8 to 15 percent slopes

Setting

Landform:

- Roy—Alluvial fans and stream terraces
- Shawmut—Alluvial fans and stream terraces
- Danvers—Alluvial fans and stream terraces

Position on landform:

- Roy—Foothills and toeslopes
- Shawmut—Foothills and toeslopes
- Danvers—Foothills and toeslopes

Slope:

- Roy—8 to 15 percent
- Shawmut—8 to 15 percent
- Danvers—8 to 15 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Roy and similar soils: 35 percent

Shawmut and similar soils: 25 percent

Danvers and similar soils: 25 percent

Minor Components

Shanley and similar soils: 0 to 5 percent

Braziel and similar soils: 0 to 5 percent

Fergus and similar soils: 0 to 5 percent

Major Component Description

Roy

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.5 inches

Shawmut

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.6 inches

Danvers

Surface layer texture: Cobbly clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

351E—Roy-Shawmut-Danvers complex, 15 to 35 percent slopes

Setting

Landform:

- Roy—Alluvial fans and stream terraces
- Shawmut—Alluvial fans and stream terraces
- Danvers—Alluvial fans and stream terraces

Position on landform:

- Roy—Backslopes and foothills
- Shawmut—Backslopes and foothills
- Danvers—Backslopes and foothills

Slope:

- Roy—15 to 35 percent
- Shawmut—15 to 35 percent
- Danvers—15 to 35 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Roy and similar soils: 35 percent

Shawmut and similar soils: 25 percent

Danvers and similar soils: 25 percent

Minor Components

Shanley and similar soils: 0 to 5 percent

Fergus and similar soils: 0 to 5 percent

Braziel and similar soils: 0 to 5 percent

Major Component Description

Roy

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.5 inches

Shawmut

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.6 inches

Danvers

Surface layer texture: Cobbly clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

351F—Roy-Shawmut-Danvers cobbly loams, 35 to 60 percent slopes

Setting

Landform:

- Roy—Alluvial fans and stream terraces
- Shawmut—Alluvial fans and stream terraces
- Danvers—Alluvial fans and stream terraces

Position on landform:

- Roy—Backslopes and shoulders
- Shawmut—Backslopes and shoulders
- Danvers—Backslopes and shoulders

Slope:

- Roy—35 to 60 percent
- Shawmut—35 to 60 percent
- Danvers—35 to 45 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Roy and similar soils: 35 percent

Shawmut and similar soils: 25 percent

Danvers and similar soils: 25 percent

Minor Components

Shanley and similar soils: 0 to 5 percent

Fergus and similar soils: 0 to 5 percent

Braziel and similar soils: 0 to 5 percent

Major Component Description

Roy

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.5 inches

Shawmut

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.6 inches

Danvers

Surface layer texture: Cobbly clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

646D—Roy-Tolbert-Danvers complex, 8 to 15 percent slopes

Setting

Landform:

- Roy—Mountains
- Tolbert—Mountains
- Danvers—Mountains

Position on landform:

- Roy—Foothills and toeslopes
- Tolbert—Foothills and toeslopes

Slope:

- Roy—8 to 15 percent
- Tolbert—10 to 15 percent
- Danvers—8 to 15 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Roy and similar soils: 35 percent

Tolbert and similar soils: 25 percent

Danvers and similar soils: 25 percent

Minor Components

Areas of rock outcrop: 0 to 8 percent

Brazier and similar soils: 0 to 7 percent

Major Component Description

Roy

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.8 inches

Tolbert

Surface layer texture: Channery loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.4 inches

Danvers

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

646E—Roy-Tolbert-Danvers complex, 15 to 35 percent slopes

Setting

Landform:

- Roy—Mountains
- Tolbert—Mountains
- Danvers—Mountains

Position on landform:

- Roy—Backslopes and foothills
- Tolbert—Backslopes and foothills
- Danvers—Backslopes and foothills

Slope:

- Roy—15 to 35 percent
- Tolbert—15 to 35 percent
- Danvers—15 to 35 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Roy and similar soils: 35 percent

Tolbert and similar soils: 25 percent

Danvers and similar soils: 25 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Brazier and similar soils: 0 to 5 percent

Major Component Description

Roy

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.8 inches

Tolbert

Surface layer texture: Channery loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.4 inches

Danvers

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

**746C—Roy-Fergus complex,
4 to 8 percent slopes****Setting**

Landform:

- Roy—Mountains
- Fergus—Mountains

Position on landform:

- Roy—Toeslopes
- Fergus—Toeslopes

Slope:

- Roy—4 to 8 percent
- Fergus—4 to 8 percent

Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Roy and similar soils: 50 percent
 Fergus and similar soils: 35 percent

Minor Components

Shanley and similar soils: 0 to 8 percent
 Braziel and similar soils: 0 to 7 percent

Major Component Description**Roy**

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

Fergus

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

**746D—Roy-Fergus complex,
8 to 15 percent slopes****Setting**

Landform:

- Roy—Mountains
- Fergus—Mountains

Position on landform:

- Roy—Footslopes and toeslopes
- Fergus—Footslopes and toeslopes

Slope:

- Roy—8 to 15 percent
- Fergus—8 to 15 percent

Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Roy and similar soils: 50 percent
 Fergus and similar soils: 35 percent

Minor Components

Shanley and similar soils: 0 to 8 percent
 Braziel and similar soils: 0 to 7 percent

Major Component Description

Roy

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

Fergus

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

746E—Roy-Fergus complex, 15 to 35 percent slopes

Setting

Landform:

- Roy—Mountains
- Fergus—Mountains

Position on landform:

- Roy—Backslopes and footslopes
- Fergus—Backslopes and footslopes

Slope:

- Roy—15 to 35 percent
- Fergus—15 to 35 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Roy and similar soils: 50 percent
 Fergus and similar soils: 35 percent

Minor Components

Shanley and similar soils: 0 to 8 percent
 Braziel and similar soils: 0 to 7 percent

Major Component Description

Roy

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

Fergus

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

746F—Roy-Fergus complex, 35 to 60 percent slopes

Setting

Landform:

- Roy—Mountains
- Fergus—Mountains

Position on landform:

- Roy—Backslopes and shoulders
- Fergus—Backslopes and shoulders

Slope:

- Roy—35 to 60 percent
- Fergus—35 to 60 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Roy and similar soils: 50 percent
 Fergus and similar soils: 35 percent

Minor Components

Shanley and similar soils: 0 to 8 percent
 Braziel and similar soils: 0 to 7 percent

Major Component Description

Roy

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

Fergus

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

100—Rubble land-Rock outcrop complex

Composition

Major Components

Rubble land: 55 percent
 Rock outcrop: 30 percent

Major Component Description

Rubble land

Definition: Areas that have more than 90 percent of the surface covered by stones or boulders

Rock outcrop

Definition: Areas of exposed bedrock

Rumsey Series

Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Permeability: Moderate
Landform: Mountains
Parent material: Colluvium derived from limestone

Slope range: 8 to 35 percent

Elevation range: 5,800 to 7,000 feet

Annual precipitation: 15 to 22 inches

Annual air temperature: 34 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Andic Eutrocryepts

Typical Pedon

Rumsey gravelly silt loam, 15 to 35 percent slopes, in an area of woodland, 1,600 feet south and 1,550 feet west of the northeast corner of sec. 12, T. 5 N., R. 14 W.

Oi—3 to 1 inches; partially decomposed forest litter.

Oe—1 to 0 inches; decomposed forest litter.

Bs—0 to 8 inches; light brown (7.5YR 6/4) gravelly silt loam, dark brown (7.5YR 4/4) moist; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; 20 percent pebbles; moderately acid; clear wavy boundary.

2Bw—8 to 16 inches; light yellowish brown (10YR 6/4) very gravelly loam, yellowish brown (10YR 5/4) moist; weak fine granular structure; soft, friable, slightly sticky, slightly plastic; many very fine and fine and few medium and coarse roots; 10 percent cobbles and 45 percent pebbles; slightly acid; clear wavy boundary.

2Bk1—16 to 29 inches; pale brown (10YR 6/3) extremely gravelly sandy loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; many very fine and fine and common medium roots; 10 percent cobbles and 55 percent pebbles; few faint lime casts on all sides of coarse fragments; strongly effervescent; slightly alkaline; clear wavy boundary.

2Bk2—29 to 38 inches; light yellowish brown (10YR 6/4) extremely gravelly loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; many very fine and fine and few medium roots; 20 percent cobbles and 50 percent pebbles; common distinct lime casts on all sides of coarse fragments; disseminated lime; strongly effervescent; slightly alkaline; gradual wavy boundary.

2Bk3—38 to 60 inches; light yellowish brown (10YR 6/4) extremely gravelly loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; many very fine and fine and few

medium roots; 20 percent cobbles and 55 percent pebbles; many prominent lime casts on all sides of coarse fragments; disseminated lime; strongly effervescent; slightly alkaline.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the 2Bk horizon: 9 to 24 inches

Bs horizon

Value: 5 or 6 dry; 3 or 4 moist

Chroma: 4 or 6

Clay content: 18 to 27 percent

Content of rock fragments: 15 to 35 percent—0 to 10 cobbles; 15 to 25 percent pebbles

Moist bulk density: 1.0 g/cm³ or less

Reaction: 5.6 to 7.8

2Bw horizon

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 3 or 4

Clay content: 18 to 27 percent

Content of rock fragments: 35 to 60 percent—10 to 15 percent cobbles; 25 to 45 percent pebbles

Reaction: 6.1 to 7.8

2Bk horizons

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 80 percent—10 to 20 percent cobbles; 25 to 60 percent pebbles

Calcium carbonate equivalent: 15 to 30 percent

Reaction: 7.4 to 8.4

78D—Rumsey gravelly silt loam, 8 to 15 percent slopes

Setting

Landform: Mountains

Position on landform: Footslopes and toeslopes

Slope: 8 to 15 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Rumsey and similar soils: 85 percent

Minor Components

Bata and similar soils: 0 to 5 percent

Evaro and similar soils: 0 to 5 percent

Elve and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly silt loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

78E—Rumsey gravelly silt loam, 15 to 35 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Rumsey and similar soils: 85 percent

Minor Components

Evaro and similar soils: 0 to 5 percent

Bata and similar soils: 0 to 5 percent

Elve and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly silt loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Sarbo Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate in the Bw horizons, rapid below

Landform: Alluvial fans and stream terraces

Parent material: Alluvium

Slope range: 2 to 4 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Pachic Haplustolls

Typical Pedon

Sarbo loam, in an area of Sarbo-Lone Rock complex, 2 to 4 percent slopes, in an area of irrigated grass hay, 1,500 feet north and 700 feet west of the southeast corner of sec. 6, T. 6 N., R. 15 W.

Ap—0 to 12 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; common very fine and fine pores; 5 percent pebbles; neutral; clear smooth boundary.

Bw1—12 to 23 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few worm casts; many very fine and fine and common medium roots; common fine and medium and many very fine tubular pores; 5 percent pebbles; neutral; clear smooth boundary.

Bw2—23 to 33 inches; pale brown (10YR 6/3) sandy clay loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; slightly hard, friable, moderately sticky, slightly plastic; common fine and medium and many very fine roots; common fine and very fine tubular pores; 5 percent pebbles; neutral; gradual smooth boundary.

2C—33 to 60 inches; pale brown (10YR 6/3) very gravelly sand, brown (10YR 5/3) moist; single grain; loose, nonsticky, nonplastic; common very

fine roots; 15 percent cobbles and 35 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 16 to 23 inches

Depth to very gravelly material: 20 to 40 inches

Ap horizon

Chroma: 2 or 3

Clay content: 15 to 27 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles

Reaction: pH 6.6 to 7.3

Bw1 horizon

Value: 4 or 5 dry

Chroma: 2 or 3

Texture: Loam, sandy loam, or sandy clay loam

Clay content: 15 to 27 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles

Reaction: pH 6.6 to 7.3

Bw2 horizon

Value: 6 or 7 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: Sandy clay loam, loam, or sandy loam

Clay content: 15 to 27 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles

Reaction: pH 6.6 to 7.8

2C horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Loamy sand or sand

Clay content: 0 to 10 percent

Content of rock fragments: 35 to 80 percent—0 to 5 percent stones; 15 to 30 percent cobbles;

20 to 45 percent pebbles

Reaction: pH 6.6 to 7.8

224B—Sarbo-Lone Rock complex, 2 to 4 percent slopes

Setting

Landform:

- Sarbo—Alluvial fans and stream terraces
- Lone Rock—Alluvial fans and stream terraces

Position on landform:

- Sarbo—Treads
- Lone Rock—Treads

Slope:

- Sarbo—2 to 4 percent
- Lone Rock—2 to 4 percent

Elevation: 3,600 to 6,200 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days**Composition****Major Components**

Sarbo and similar soils: 50 percent

Lone Rock and similar soils: 35 percent

Minor Components

Perma and similar soils: 0 to 8 percent

Straw and similar soils: 0 to 7 percent

Major Component Description**Sarbo***Surface layer texture:* Loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Alluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 6.3 inches**Lone Rock***Surface layer texture:* Cobbly loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Alluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 1.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Saypo Series*Depth class:* Very deep (more than 60 inches)*Drainage class:* Somewhat poorly drained*Permeability:* Moderately slow*Landform:* Alluvial fans, stream terraces, and flood plains*Parent material:* Alluvium*Slope range:* 0 to 4 percent*Elevation range:* 3,800 to 5,000 feet*Annual precipitation:* 10 to 19 inches*Annual air temperature:* 39 to 44 degrees F*Frost-free period:* 70 to 105 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Aquic Calciustolls

Typical Pedon

Saypo loam, cool, 0 to 4 percent slopes, in an area of pasture, 2,100 feet south and 1,500 feet west of the northeast corner of sec. 23, T. 7 N., R. 14 W.

Oe—2 inches to 0; partially decomposed organic matter.

A—0 to 12 inches; very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) dry; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine roots; common very fine interstitial pores; violently effervescent; moderately alkaline; clear smooth boundary.

Bk1—12 to 18 inches; dark grayish brown (10YR 4/2) loam, light brownish gray (10YR 6/2) dry; weak medium subangular blocky structure; soft, very friable, moderately sticky, moderately plastic; many very fine roots; few very fine interstitial pores; disseminated lime; few fine masses of lime; strongly effervescent; moderately alkaline; clear smooth boundary.

Bk2—18 to 26 inches; brown (10YR 5/3) loam, pale brown (10YR 6/3) dry; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; many very fine roots; 10 percent pebbles; disseminated lime; few fine masses of lime; strongly effervescent; moderately alkaline; clear smooth boundary.

Bk3—26 to 41 inches; yellowish brown (10YR 5/4) gravelly loam, light yellowish brown (10YR 6/4) dry; common fine distinct reddish yellow (7.5YR 6/8) redox concentrations; weak fine subangular blocky structure; hard, friable, slightly sticky, moderately plastic; common very fine roots; 5 percent cobbles and 25 percent pebbles; disseminated lime; few fine masses of lime; slightly effervescent; moderately alkaline; clear smooth boundary.

C—41 to 60 inches; yellowish brown (10YR 5/4) very gravelly sandy loam; light yellowish brown (10YR 6/4) dry; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots; 10 percent cobbles and 30 percent pebbles; disseminated lime; slightly effervescent; slightly alkaline.

Range in Characteristics

Soil temperature: 42 to 46 degrees F

Thickness of the mollic epipedon: 7 to 16 inches

Depth to the seasonal high water table: 24 to 42 inches

A horizon

Hue: 10YR or 2.5Y

Value: 2 or 3 moist; 3 or 4 dry

Chroma: 1 or 2

Texture: Loam or silt loam

Clay content: 22 to 27 percent

Calcium carbonate equivalent: 5 to 10 percent

Reaction: pH 7.4 to 8.4

Bk1 horizon

Hue: 10YR or 2.5Y

Value: 4 to 6 moist; 5 to 7 dry

Chroma: 2 or 3

Texture: Loam or clay loam

Clay content: 22 to 35 percent

Content of rock fragments: 0 to 5 percent pebbles

Calcium carbonate equivalent: 20 to 25 percent

Reaction: pH 7.9 to 8.4

Bk2 horizon

Hue: 10YR or 2.5Y

Value: 4 to 6 moist; 5 to 7 dry

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 22 to 35 percent

Content of rock fragments: 0 to 35 percent—0 to 5 percent cobbles; 0 to 30 percent pebbles

Calcium carbonate equivalent: 30 to 35 percent

Reaction: pH 7.9 to 8.4

Bk3 horizon

Hue: 10YR or 2.5Y

Value: 4 to 6 moist; 5 to 7 dry

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 22 to 35 percent

Content of rock fragments: 0 to 35 percent—0 to 5 percent cobbles; 0 to 30 percent pebbles

Calcium carbonate equivalent: 30 to 35 percent

Reaction: pH 7.9 to 8.4

C horizon

Hue: 10YR to 5Y

Value: 4 or 5 moist; 5 or 6 dry

Chroma: 2 to 4

Texture: Loam or sandy loam

Clay content: 18 to 27 percent

Content of rock fragments: 5 to 50 percent—0 to 10 percent cobbles; 5 to 40 percent pebbles

Calcium carbonate equivalent: 30 to 35 percent

Reaction: pH 7.9 to 8.4

435B—Saypo silt loam, cool, 0 to 4 percent slopes, rarely flooded

Setting

Landform: Flood plains

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 3,800 to 5,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Saypo and similar soils: 85 percent

Minor Components

Tetonview and similar soils: 0 to 4 percent

Kleinschmidt and similar soils: 0 to 4 percent

Gregson and similar soils: 0 to 4 percent

Nythar and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Silt loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Apparent

Available water capacity: Mainly 8.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

445B—Saypo silt loam, 0 to 4 percent slopes, rarely flooded

Setting

Landform: Flood plains

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 3,800 to 5,000 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Saypo and similar soils: 85 percent

Minor Components

Tetonview and similar soils: 0 to 4 percent
 Con and similar soils: 0 to 4 percent
 Kleinschmidt and similar soils: 0 to 4 percent
 Gregson and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Silt loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Apparent
Available water capacity: Mainly 8.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

535B—Saypo loam, cool, 0 to 4 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Treads
Slope: 0 to 4 percent
Elevation: 3,800 to 5,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Saypo and similar soils: 85 percent

Minor Components

Tetonview and similar soils: 0 to 5 percent
 Mcmanus and similar soils: 0 to 5 percent
 Quigley and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Apparent
Available water capacity: Mainly 8.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

545B—Saypo silt loam, 0 to 4 percent slopes**Setting**

Landform: Alluvial fans and stream terraces
Position on landform: Treads
Slope: 0 to 4 percent
Elevation: 3,800 to 5,000 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Composition**Major Components**

Saypo and similar soils: 85 percent

Minor Components

Tetonview and similar soils: 0 to 4 percent
 Con and similar soils: 0 to 4 percent
 Mcmanus and similar soils: 0 to 4 percent
 Gregson and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Silt loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Apparent
Available water capacity: Mainly 8.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Shanley Series

Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Permeability: Moderately slow
Landform: Stream terraces and mountains

Parent material: Alluvium, colluvium and material weathered from extrusive igneous rocks

Slope range: 4 to 60 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Clayey-skeletal, mixed, superactive, frigid Typic Argiustolls

Typical Pedon

Shanley gravelly loam, 4 to 8 percent slopes, in an area of rangeland, 2,600 feet south and 2,300 feet west of the northeast corner of sec. 22, T. 7 N., R. 15 W.

A—0 to 6 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, slightly plastic; many very fine roots; many very fine and fine tubular pores; 5 percent cobbles, 20 percent pebbles; neutral; clear smooth boundary.

Bt1—6 to 15 inches; reddish brown (5YR 5/3) very gravelly clay loam, dark reddish brown (5YR 3/3) moist; moderate fine subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; many very fine and fine roots; common very fine tubular pores; common faint clay films on faces of peds; 10 percent cobbles, 30 percent pebbles; slightly alkaline; gradual wavy boundary.

Bt2—15 to 28 inches; reddish brown (5YR 5/4) very gravelly clay loam, reddish brown (5YR 4/4) moist; moderate fine subangular blocky structure; extremely hard, firm, moderately sticky, moderately plastic; many very fine and fine roots; few very fine tubular pores; common faint clay films on faces of peds; 10 percent cobbles, 35 percent pebbles; moderately alkaline; gradual wavy boundary.

Bt3—28 to 60 inches; reddish brown (5YR 5/4) very gravelly clay loam, reddish brown (5YR 4/4) moist; moderate fine subangular blocky structure; extremely hard, firm, moderately sticky, moderately plastic; common very fine roots; few very fine tubular pores; few faint clay films on faces of peds; 10 percent cobbles, 35 percent pebbles; slightly alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 10 to 15 inches

A horizon

Value: 3 to 5 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 5 percent stones; 5 to 10 percent cobbles; 10 to 20 percent pebbles

Reaction: pH 6.6 to 7.3

Bt horizons

Hue: 10YR to 5YR

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 6

Texture: Clay or clay loam

Clay content: 35 to 60 percent

Content of rock fragments: 35 to 60 percent—10 to 25 percent cobbles; 25 to 35 percent pebbles

Reaction: pH 6.6 to 8.4

19C—Shanley gravelly loam, 4 to 8 percent slopes

Setting

Landform: Mountains

Position on landform: Toeslopes

Slope: 4 to 8 percent

Elevation: 3,800 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Shanley and similar soils: 85 percent

Minor Components

Fergus and similar soils: 0 to 5 percent

Libeg and similar soils: 0 to 5 percent

Shanley, greater slope: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium or colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

19D—Shanley gravelly loam, 8 to 15 percent slopes

Setting

Landform: Mountains
Position on landform: Foothills and toeslopes
Slope: 8 to 15 percent
Elevation: 3,800 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Shanley and similar soils: 85 percent

Minor Components

Fergus and similar soils: 0 to 5 percent
Libeg and similar soils: 0 to 5 percent
Shanley, greater slope: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

19E—Shanley gravelly loam, 15 to 35 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and foothills
Slope: 15 to 35 percent
Elevation: 3,800 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Shanley and similar soils: 85 percent

Minor Components

Fergus and similar soils: 0 to 5 percent
Libeg and similar soils: 0 to 5 percent
Shanley, lesser slope: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

119E—Shanley stony loam, 15 to 35 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and foothills
Slope: 15 to 35 percent
Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Shanley and similar soils: 85 percent

Minor Components

Fergus and similar soils: 0 to 5 percent
Libeg and similar soils: 0 to 5 percent
Shanley, lesser slope: 0 to 5 percent

Major Component Description

Surface layer texture: Stony loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium or colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

142E—Shanley-Brazil-Water complex, 8 to 25 percent slopes

Setting

Landform:

- Shanley—Stream terraces
- Brazil—Stream terraces

Position on landform:

- Shanley—Backslopes and footslopes
- Brazil—Backslopes and footslopes

Slope:

- Shanley—8 to 25 percent
- Brazil—8 to 25 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Shanley and similar soils: 55 percent

Brazil and similar soils: 20 percent

Water: 10 percent

Minor Components

Perma and similar soils: 0 to 5 percent

Straw and similar soils: 0 to 5 percent

Quigley and similar soils: 0 to 5 percent

Major Component Description

Shanley

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.3 inches

Brazil

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.2 inches

Water

Definition: Areas of open water

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

846C—Shanley-Tolbert complex, 4 to 8 percent slopes

Setting

Landform:

- Shanley—Mountains
- Tolbert—Mountains

Position on landform:

- Shanley—Toeslopes
- Tolbert—Toeslopes

Slope:

- Shanley—4 to 8 percent
- Tolbert—4 to 8 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Shanley and similar soils: 70 percent

Tolbert and similar soils: 20 percent

Minor Components

Areas of rock outcrop: 0 to 4 percent

Danvers and similar soils: 0 to 4 percent

Martinsdale and similar soils: 0 to 2 percent

Major Component Description

Shanley

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.5 inches

Tolbert

Surface layer texture: Very stony loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

**846D—Shanley-Tolbert complex,
8 to 15 percent slopes****Setting***Landform:*

- Shanley—Mountains
- Tolbert—Mountains

Position on landform:

- Shanley—Foothills and toeslopes
- Tolbert—Foothills and toeslopes

Slope:

- Shanley—8 to 15 percent
- Tolbert—8 to 15 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition**Major Components**

Shanley and similar soils: 65 percent

Tolbert and similar soils: 20 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Danvers and similar soils: 0 to 5 percent

Martinsdale and similar soils: 0 to 5 percent

Major Component Description**Shanley**

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.5 inches

Tolbert

Surface layer texture: Very stony loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

**846E—Shanley-Tolbert complex,
15 to 35 percent slopes****Setting***Landform:*

- Shanley—Mountains
- Tolbert—Mountains

Position on landform:

- Shanley—Backslopes and foothills
- Tolbert—Backslopes and foothills

Slope:

- Shanley—15 to 35 percent
- Tolbert—15 to 35 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition**Major Components**

Shanley and similar soils: 65 percent

Tolbert and similar soils: 20 percent

Minor Components

Areas of rock outcrop: 0 to 3 percent

Rubble land: 0 to 3 percent

Shanley and similar soils: 0 to 4 percent

Danvers and similar soils: 0 to 5 percent

Major Component Description**Shanley**

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)

Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.5 inches

Tolbert

Surface layer texture: Stony loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

846F—Shanley-Tolbert complex, 35 to 60 percent slopes

Setting

Landform:

- Shanley—Mountains
- Tolbert—Mountains

Position on landform:

- Shanley—Backslopes and shoulders
- Tolbert—Backslopes and shoulders

Slope:

- Shanley—35 to 60 percent
- Tolbert—35 to 50 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Shanley and similar soils: 70 percent
 Tolbert and similar soils: 20 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
 Rubble land: 0 to 5 percent

Major Component Description

Shanley

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.5 inches

Tolbert

Surface layer texture: Stony loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Shawmut Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Mountains, alluvial fans, and stream terraces

Parent material: Alluvium

Slope range: 0 to 60 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Typic Argiustolls

Typical Pedon

Shawmut cobbly loam, 15 to 35 percent slopes, in an area of rangeland, 400 feet south and 500 feet west of the northeast corner of sec. 20, T. 10 N., R. 13 W.

- A—0 to 4 inches; dark grayish brown (10YR 4/2) cobbly loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; 10 percent cobbles and 10 percent pebbles; neutral; clear wavy boundary.
- Bt1—4 to 8 inches; dark grayish brown (10YR 4/2) gravelly clay loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic structure parting to moderate fine subangular blocky; hard, very friable, moderately sticky, moderately plastic; many very fine and fine and common medium roots; common fine pores; many faint clay films on faces of peds and coarse fragments; 5 percent cobbles and 30 percent pebbles; neutral; clear wavy boundary.
- Bt2—8 to 16 inches; brown (7.5YR 5/4) very gravelly clay loam, dark brown (7.5YR 4/4) moist; weak medium prismatic structure parting to moderate medium subangular blocky; hard, very friable, moderately sticky, moderately plastic; common very fine and fine and few medium roots; common fine pores; many distinct clay films on faces of peds and coarse fragments; 5 percent cobbles and 35 percent pebbles; neutral; clear wavy boundary.
- Btk—16 to 25 inches; brown (7.5YR 5/4) very gravelly clay loam, dark brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; hard, very friable, moderately sticky, moderately plastic; few very fine, fine, and medium roots; common fine pores; many faint clay films on faces of peds; 5 percent cobbles and 40 percent pebbles; many distinct lime casts on undersides of coarse fragments; strongly effervescent; moderately alkaline; clear wavy boundary.
- Bk1—25 to 38 inches; pale brown (10YR 6/3) very gravelly clay loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; few fine and medium roots; common very fine pores; 5 percent cobbles and 50 percent pebbles; many distinct lime casts on underside and sides of coarse fragments; common medium masses and seams of lime; violently effervescent; moderately alkaline; clear wavy boundary.
- Bk2—38 to 60 inches; pale brown (10YR 6/3) extremely gravelly loam; brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly

hard, very friable, slightly sticky, slightly plastic; few fine and very fine roots; 10 percent cobbles and 60 percent pebbles; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 16 inches

A horizon

Hue: 10YR or 7.5YR

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 60 percent—0 to 20 percent cobbles; 15 to 40 percent pebbles

Reaction: pH 6.6 to 7.3

Bt horizons

Hue: 10YR or 7.5YR

Value: 3 to 5 dry; 2 to 4 moist

Chroma: 2 to 4

Texture: Clay loam or sandy clay loam

Clay content: 20 to 35 percent

Content of rock fragments: 35 to 45 percent—5 to 10 percent cobbles; 30 to 35 percent pebbles

Reaction: pH 6.6 to 7.3

Btk horizon

Hue: 10YR or 7.5YR

Value: 3 to 6 dry; 2 to 5 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 15 to 30 percent

Content of rock fragments: 40 to 55 percent—0 to 5 percent cobbles; 40 to 50 percent pebbles

Calcium carbonate equivalent: 15 to 30 percent

Reaction: pH 7.9 to 8.4

Bk horizons

Hue: 10YR or 2.5Y

Value: 5 to 8 dry; 4 to 7 moist

Chroma: 2 or 3

Texture: Loam, sandy loam, or clay loam

Clay content: 10 to 30 percent

Content of rock fragments: 55 to 70 percent—5 to 10 percent cobbles; 50 to 60 percent pebbles

Calcium carbonate equivalent: 10 to 30 percent

Reaction: pH 7.9 to 9.0

51B—Shawmut gravelly loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 0 to 4 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Shawmut and similar soils: 85 percent

Minor Components

Martinsdale and similar soils: 0 to 5 percent
 Quigley and similar soils: 0 to 5 percent
 Danvers and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

51C—Shawmut gravelly loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Shawmut and similar soils: 85 percent

Minor Components

Martinsdale and similar soils: 0 to 5 percent
 Quigley and similar soils: 0 to 5 percent
 Danvers and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

51D—Shawmut gravelly loam, 8 to 15 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Shawmut and similar soils: 85 percent

Minor Components

Quigley and similar soils: 0 to 5 percent
 Martinsdale and similar soils: 0 to 5 percent
 Danvers and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

51E—Shawmut gravelly loam, 15 to 35 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Shawmut and similar soils: 85 percent

Minor Components

Martinsdale and similar soils: 0 to 5 percent
Quigley and similar soils: 0 to 5 percent
Danvers and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

51F—Shawmut gravelly loam, 35 to 60 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Shawmut and similar soils: 85 percent

Minor Components

Martinsdale and similar soils: 0 to 5 percent
Quigley and similar soils: 0 to 5 percent
Danvers and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

151C—Shawmut cobbly loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Shawmut and similar soils: 85 percent

Minor Components

Danvers and similar soils: 0 to 5 percent
Roy and similar soils: 0 to 5 percent
Martinsdale and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

151D—Shawmut cobbly loam, 8 to 15 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Shawmut and similar soils: 85 percent

Minor Components

Roy and similar soils: 0 to 5 percent
Danvers and similar soils: 0 to 5 percent
Martinsdale and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

151E—Shawmut cobbly loam, 15 to 35 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Shawmut and similar soils: 85 percent

Minor Components

Roy and similar soils: 0 to 5 percent
Danvers and similar soils: 0 to 5 percent
Martinsdale and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

151F—Shawmut cobbly loam, 35 to 60 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Shawmut and similar soils: 85 percent

Minor Components

Roy and similar soils: 0 to 5 percent
Danvers and similar soils: 0 to 5 percent
Martinsdale and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained

Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

251E—Shawmut very stony loam, 15 to 35 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Shawmut and similar soils: 85 percent

Minor Components

Roy and similar soils: 0 to 8 percent
 Winspect and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Very stony loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

451C—Shawmut very bouldery loam, 0 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 0 to 8 percent
Elevation: 3,600 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Shawmut and similar soils: 85 percent

Minor Components

Martinsdale and similar soils: 0 to 5 percent
 Quigley and similar soils: 0 to 5 percent
 Danvers and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Very bouldery loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Silverchief Series

Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Permeability: Moderately slow
Landform: Mountains
Parent material: Colluvium derived from limestone
Slope range: 8 to 60 percent
Elevation range: 3,600 to 6,400 feet
Annual precipitation: 18 to 25 inches
Annual air temperature: 38 to 42 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Fine, mixed, superactive, frigid
Calcic Haplustalfs

Typical Pedon

Silverchief loam, in an area of Silverchief-Trapps complex, 15 to 35 percent slopes, in an area of woodland, 300 feet north and 3,400 feet east of the southwest corner of sec. 24, T. 5 N., R. 16 W.

Oi—2 inches to 0; undecomposed and slightly decomposed forest litter.

E—0 to 3 inches; light brownish gray (10YR 6/2) loam, grayish brown (10YR 5/2) moist; moderate thin platy structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; few fine interstitial pores; 5 percent pebbles; slightly acid; clear wavy boundary.

Bt1—3 to 12 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; moderate fine subangular blocky structure; hard, friable, moderately sticky, moderately plastic; many very fine and fine, common medium and few coarse roots; common fine interstitial pores; few faint clay films on faces of pedis; 10 percent pebbles; slightly acid; clear wavy boundary.

Bt2—12 to 20 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium angular blocky structure; very hard, very firm, very sticky, very plastic; many very fine and fine, common medium and few coarse roots; common fine tubular pores; few faint clay films on faces of pedis; 10 percent pebbles; neutral; clear wavy boundary.

Bt3—20 to 38 inches; pale brown (10YR 6/3) gravelly clay, brown (10YR 5/3) moist; strong medium angular blocky structure; very hard, very firm, very sticky, very plastic; common very fine and fine and few medium and coarse roots; common fine and many very fine tubular pores; few faint clay films on faces of pedis; 15 percent pebbles; neutral; gradual smooth boundary.

Bk—38 to 60 inches; light gray (2.5Y 7/2) gravelly clay loam; light brownish gray (2.5Y 6/2) moist; weak fine subangular blocky structure; hard, firm, moderately sticky, moderately plastic; few fine roots; common very fine and fine tubular pores; 5 percent cobbles; 25 percent pebbles; common fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 40 to 44 degrees F

Moisture control section: Between 4 and 12 inches

E horizon

Hue: 10YR or 7.5YR

Value: 6 or 7 dry; 5 or 6 moist

Chroma: 2 to 4

Clay content: 20 to 27 percent

Content of rock fragments: 0 to 30 percent—0 to 15 percent cobbles; 0 to 15 percent pebbles

Reaction: pH 6.1 to 7.3

Bt horizons

Hue: 7.5YR to 2.5Y

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 3, 4, or 6

Texture: Clay loam or clay

Clay content: 35 to 60 percent

Content of rock fragments: 10 to 30 percent—0 to 10 percent cobbles; 10 to 20 percent pebbles

Reaction: pH 6.1 to 7.8

Bk horizon

Hue: 7.5YR to 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 20 to 30 percent

Content of rock fragments: 20 to 50 percent—5 to 15 percent cobbles; 15 to 35 percent pebbles

Calcium carbonate equivalent: 15 to 35 percent

Reaction: pH 7.4 to 9.0

599D—Silverchief-Trapps complex, 8 to 15 percent slopes

Setting

Landform:

- Silverchief—Mountains
- Trapps—Mountains

Position on landform:

- Silverchief—Footslopes and toeslopes
- Trapps—Footslopes and toeslopes

Slope:

- Silverchief—8 to 15 percent, northeast aspect
- Trapps—8 to 15 percent

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Silverchief and similar soils: 45 percent

Trapps and similar soils: 40 percent

Minor Components

Whitecow and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent
 Crow and similar soils: 0 to 5 percent

Major Component Description**Silverchief**

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 7.5 inches

Trapps

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

**599E—Silverchief-Trapps complex,
15 to 35 percent slopes****Setting***Landform:*

- Silverchief—Mountains
- Trapps—Mountains

Position on landform:

- Silverchief—Backslopes and footslopes
- Trapps—Backslopes and footslopes

Slope:

- Silverchief—15 to 35 percent, northeast aspect
- Trapps—15 to 35 percent

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition**Major Components**

Silverchief and similar soils: 45 percent
 Trapps and similar soils: 40 percent

Minor Components

Whitecow and similar soils: 0 to 5 percent
 Crow and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent

Major Component Description**Silverchief**

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 7.6 inches

Trapps

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

**599F—Silverchief-Trapps complex,
35 to 60 percent slopes****Setting***Landform:*

- Silverchief—Mountains
- Trapps—Mountains

Position on landform:

- Silverchief—Backslopes and shoulders
- Trapps—Backslopes and shoulders

Slope:

- Silverchief—35 to 60 percent, northeast aspect
- Trapps—35 to 60 percent

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition**Major Components**

Silverchief and similar soils: 45 percent
 Trapps and similar soils: 40 percent

Minor Components

Whitecow and similar soils: 0 to 5 percent

Crow and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Major Component Description**Silverchief**

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 7.6 inches

Trapps

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Sixbeacon Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Alluvial fans and stream terraces

Parent material: Alluvium

Slope range: 0 to 60 percent

Elevation range: 3,600 to 5,400 feet

Annual precipitation: 10 to 14 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 90 to 105 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Aridic Haplustolls

Typical Pedon

Sixbeacon cobbly loam, 4 to 8 percent slopes, in an area of hayland, 2,600 feet north and 1,250 feet west of the southeast corner of sec. 13, T. 10 N., R. 12 W.

A—0 to 5 inches; grayish brown (10YR 5/2) cobbly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and few medium roots; many very fine interstitial pores; 15 percent cobbles and 20 percent pebbles; slightly alkaline; clear smooth boundary.

Bw—5 to 9 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, friable, slightly sticky, slightly plastic; many very fine and few medium roots; many very fine interstitial pores; 10 percent cobbles and 20 percent pebbles; slightly alkaline; clear smooth boundary.

Bk1—9 to 14 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and common medium roots; common very fine tubular pores; 10 percent cobbles and 25 percent pebbles; disseminated lime; few fine masses of lime; strongly effervescent; moderately alkaline; clear smooth boundary.

2Bk2—14 to 23 inches; white (10YR 8/1) very gravelly loam, very pale brown (10YR 7/3) moist; weak fine subangular blocky structure; slightly hard, firm, slightly sticky, moderately plastic; common fine and few medium roots; many very fine tubular pores; 15 percent cobbles and 25 percent pebbles; disseminated lime; few fine masses and seams of lime; violently effervescent; moderately alkaline; clear wavy boundary.

2Bk3—23 to 60 inches; white (10YR 8/2) very gravelly sandy loam; pale brown (10YR 6/3) moist; weak fine subangular blocky structure; slightly hard, firm, slightly sticky, moderately plastic; few fine and medium roots; few very fine tubular pores; 10 percent cobbles and 45 percent pebbles; disseminated lime; few fine masses and seams of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

Depth to the calcic horizon: 10 to 13 inches

A horizon

Chroma: 2 or 3

Clay content: 20 to 27 percent

Content of rock fragments: 0 to 35 percent—0 to 15 percent cobbles; 0 to 20 percent pebbles
Reaction: pH 6.1 to 7.8

Bw horizon

Value: 4 to 6 dry; 3 to 5 moist
Chroma: 2 or 3
Clay content: 20 to 27 percent
Content of rock fragments: 0 to 35 percent—0 to 10 percent cobbles; 0 to 25 percent pebbles
Reaction: pH 6.6 to 8.4

Bk1 and 2Bk2 horizons

Value: 6 to 8 dry; 4 to 7 moist
Chroma: 1 to 3
Clay content: 10 to 20 percent
Content of rock fragments: 35 to 70 percent—10 to 20 percent cobbles; 25 to 50 percent pebbles
Calcium carbonate equivalent: 20 to 40 percent
Reaction: pH 7.9 to 8.4

2Bk3 horizon

Value: 5 to 7 dry; 4 to 6 moist
Chroma: 2 to 4
Clay content: 0 to 5 percent
Content of rock fragments: 50 to 80 percent—10 to 20 percent cobbles; 40 to 60 percent pebbles
Calcium carbonate equivalent: 15 to 30 percent
Reaction: pH 7.4 to 8.4

137B—Sixbeacon cobbly loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 0 to 4 percent
Elevation: 3,600 to 5,400 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Composition

Major Components

Sixbeacon and similar soils: 85 percent

Minor Components

Anaconda and similar soils: 0 to 5 percent
Rothiemay and similar soils: 0 to 5 percent
Con and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

137C—Sixbeacon cobbly loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 3,600 to 5,400 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Composition

Major Components

Sixbeacon and similar soils: 85 percent

Minor Components

Anaconda and similar soils: 0 to 5 percent
Rothiemay and similar soils: 0 to 5 percent
Con and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

137D—Sixbeacon cobbly loam, 8 to 15 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 3,600 to 5,400 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Composition

Major Components

Sixbeacon and similar soils: 85 percent

Minor Components

Anaconda and similar soils: 0 to 5 percent

Con and similar soils: 0 to 5 percent

Rothiemay and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Cobbly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

237B—Sixbeacon gravelly loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 0 to 4 percent
Elevation: 3,600 to 5,400 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Composition

Major Components

Sixbeacon and similar soils: 85 percent

Minor Components

Anaconda and similar soils: 0 to 5 percent

Rothiemay and similar soils: 0 to 5 percent

Con and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

237C—Sixbeacon gravelly loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 3,600 to 5,400 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Composition

Major Components

Sixbeacon and similar soils: 85 percent

Minor Components

Anaconda and similar soils: 0 to 5 percent

Con and similar soils: 0 to 5 percent

Rothiemay and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Straw Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Alluvial fans

Parent material: Calcareous alluvium

Slope range: 0 to 8 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Cumulic Haplustolls

Typical Pedon

Straw silty clay loam, 0 to 4 percent slopes, in an area of irrigated cropland, 1,100 feet south and 1,700 feet east of the northwest corner of sec. 36, T. 10 N., R. 13 W.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure parting to moderate medium granular; slightly hard, friable, slightly sticky, moderately plastic; many very fine and fine and common medium roots; few very fine tubular and many discontinuous pores; 5 percent cobbles; slightly alkaline; gradual wavy boundary.

A—6 to 16 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure parting to moderate medium granular; slightly hard, friable, slightly sticky, moderately plastic; common very fine, fine, and medium roots; few very fine tubular and many discontinuous pores; 5 percent cobbles; slightly alkaline; clear wavy boundary.

Bw1—16 to 23 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; common very fine and fine and many

discontinuous pores; 5 percent cobbles; slightly effervescent; moderately alkaline; gradual wavy boundary.

Bw2—23 to 60 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; common very fine, fine and medium discontinuous pores; 5 percent cobbles; slightly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 16 to 25 inches

Ap horizon

Hue: 10YR or 2.5Y

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 27 to 35 percent

Content of rock fragments: 0 to 10 percent

Reaction: pH 6.6 to 8.4

A horizon

Hue: 10YR or 2.5Y

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 2 or 3

Texture: Loam or clay loam

Clay content: 22 to 32 percent

Content of rock fragments: 0 to 10 percent

Reaction: pH 6.6 to 7.8

Bw horizons

Hue: 10YR or 2.5Y

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 22 to 35 percent

Content of rock fragments: 0 to 10 percent

Calcium carbonate equivalent: 0 to 10 percent

Reaction: pH 7.8 to 8.4

25B—Straw silty clay loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans

Position on landform: Microlows

Slope: 0 to 4 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Straw and similar soils: 85 percent

Minor Components

Quigley and similar soils: 0 to 5 percent

Perma and similar soils: 0 to 5 percent

Martinsdale and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silty clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 10.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

25C—Straw silty clay loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans

Position on landform: Microlows

Slope: 4 to 8 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Straw and similar soils: 85 percent

Minor Components

Quigley and similar soils: 0 to 5 percent

Perma and similar soils: 0 to 5 percent

Martinsdale and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silty clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 10.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Tanna Series

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Slow

Landform: Sedimentary plains and hills

Parent material: Material derived from semiconsolidated sedimentary beds

Slope range: 0 to 15 percent

Elevation range: 3,600 to 5,400 feet

Annual precipitation: 10 to 14 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 90 to 105 days

Taxonomic Class: Fine, smectitic, frigid Aridic Argiustolls

Typical Pedon

Tanna loam, 8 to 15 percent slopes, in an area of rangeland, 3,200 feet north and 1,400 feet east of the southwest corner of sec. 1, T. 10 N., R. 14 W.

A—0 to 5 inches; grayish brown (2.5Y 5/2) loam, very dark grayish brown (2.5Y 3/2) moist; moderate fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine roots; many fine and very fine interstitial pores; neutral; clear smooth boundary.

Bt1—5 to 12 inches; brown (10YR 5/3) silty clay loam, dark brown (10YR 3/3) moist; strong medium subangular blocky structure; hard, firm, moderately sticky, moderately plastic; many very fine roots; many fine and very fine interstitial pores; few faint clay films on faces of peds; moderately alkaline; clear smooth boundary.

Bt2—12 to 21 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; many very fine roots; many fine and very fine interstitial pores; few faint clay films on faces of peds; moderately alkaline; clear smooth boundary.

Bk—21 to 30 inches; light gray (2.5Y 7/2) silty clay loam, light yellowish brown (2.5Y 6/4) moist; moderate medium subangular blocky structure; very hard, firm, moderately sticky, moderately

plastic; many very fine roots; many fine and very fine interstitial pores; few fine masses of lime; strongly effervescent; moderately alkaline; clear smooth boundary.

Cr—30 to 60 inches; semiconsolidated shale that crushes to silty clay loam.

Range in Characteristics

Soil temperature: 40 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 12 inches

Depth to the 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 27 percent

Reaction: pH 6.6 to 7.8

Bt horizons

Hue: 10YR or 2.5Y

Value: 3 or 4 moist

Chroma: 2 or 3

Texture: Silty clay loam, clay loam, or clay

Clay content: 35 to 50 percent

Reaction: pH 6.6 to 8.4

Bk horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Loam or silty clay loam

Clay content: 15 to 40 percent

Electrical conductivity (mmhos/cm): 2 to 4

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4

65C—Tanna loam, 4 to 8 percent slopes

Setting

Landform: Sedimentary plains

Position on landform: Toeslopes

Slope: 4 to 8 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Tanna and similar soils: 85 percent

Minor Components

Dolus and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Boxwell and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Semiconsolidated sedimentary beds

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

65D—Tanna loam, 8 to 15 percent slopes

Setting

Landform: Hills

Position on landform: Foothills and toeslopes

Slope: 8 to 15 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Tanna and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Dolus and similar soils: 0 to 5 percent

Boxwell and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Semiconsolidated sedimentary beds

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

265B—Tanna-Boxwell loams, 0 to 4 percent slopes

Setting

Landform:

- Tanna—Sedimentary plains
- Boxwell—Sedimentary plains

Position on landform:

- Tanna—Toeslopes
- Boxwell—Toeslopes

Slope:

- Tanna—0 to 4 percent
- Boxwell—0 to 4 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Tanna and similar soils: 65 percent

Boxwell and similar soils: 20 percent

Minor Components

Doney and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Dolus and similar soils: 0 to 5 percent

Major Component Description

Tanna

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Semiconsolidated sedimentary beds

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.4 inches

Boxwell

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Semiconsolidated sedimentary beds

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

265C—Tanna-Boxwell loams, 4 to 8 percent slopes

Setting

Landform:

- Tanna—Sedimentary plains
- Boxwell—Sedimentary plains

Position on landform:

- Tanna—Toeslopes
- Boxwell—Toeslopes

Slope:

- Tanna—4 to 8 percent
- Boxwell—4 to 8 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Tanna and similar soils: 65 percent

Boxwell and similar soils: 20 percent

Minor Components

Doney and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Dolus and similar soils: 0 to 5 percent

Major Component Description

Tanna

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Semiconsolidated sedimentary beds

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.4 inches

Boxwell

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Semiconsolidated sedimentary beds

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

265D—Tanna-Boxwell loams, 8 to 15 percent slopes

Setting

Landform:

- Tanna—Hills
- Boxwell—Hills

Position on landform:

- Tanna—Footslopes and toeslopes
- Boxwell—Footslopes and toeslopes

Slope:

- Tanna—8 to 15 percent
- Boxwell—8 to 15 percent

Elevation: 3,600 to 5,400 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Tanna and similar soils: 65 percent

Boxwell and similar soils: 20 percent

Minor Components

Doney and similar soils: 0 to 5 percent

Dolus and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Major Component Description

Tanna

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Semiconsolidated sedimentary beds

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.4 inches

Boxwell

Surface layer texture: Loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Dominant parent material: Semiconsolidated sedimentary beds

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Tetonview Series

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly drained

Permeability: Moderately slow

Landform: Alluvial fans and stream terraces

Parent material: Alluvium

Slope range: 0 to 4 percent

Elevation range: 3,600 to 6,000 feet

Annual precipitation: 10 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 105 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Aeric Calciaquolls

Typical Pedon

Tetonview loam, 0 to 4 percent slopes, in an area of pasture, 1,500 feet north and 2,000 feet west of the southeast corner of sec. 13, T. 10 N., R. 13 W.

A—0 to 7 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine and fine pores; strongly effervescent; moderately alkaline; clear smooth boundary.

Bkg1—7 to 13 inches; dark grayish brown (10YR 4/2) loam, light brownish gray (10YR 6/2) dry; moderate fine subangular blocky structure; soft, friable, slightly sticky, slightly plastic; common very fine and fine roots; few very fine pores;

disseminated lime; few fine masses of lime; strongly effervescent; moderately alkaline; clear smooth boundary.

Bkg2—13 to 32 inches; dark grayish brown (10YR 4/2) loam, light gray (10YR 7/2) dry; weak medium subangular blocky structure; soft, friable, slightly sticky, slightly plastic; few very fine roots; few very fine pores; many medium and coarse masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

Cg1—32 to 49 inches; brown (10YR 5/3) loam; light yellowish brown (10YR 6/4) dry; many medium prominent brown (7.5YR 5/4) redox concentrations; massive; soft, friable, slightly sticky, slightly plastic; few very fine roots; few very fine pores; neutral; clear smooth boundary.

Cg2—49 to 60 inches; yellowish brown (10YR 5/4) very gravelly sandy loam; light yellowish brown (10YR 6/4) dry; single grain; loose, nonsticky, nonplastic; few very fine roots; few very fine pores; 10 percent cobbles, 25 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 16 inches

Depth to the calcic horizon: 7 to 13 inches

Depth to the seasonal high water table: 12 to 24 inches

A horizon

Hue: 10YR or 2.5Y

Value: 2 or 3 moist; 3 to 5 dry

Chroma: 1 or 2

Clay content: 20 to 27 percent

Content of rock fragments: 0 to 5 percent pebbles

Calcium carbonate equivalent: 1 to 5 percent

Reaction: pH 7.4 to 8.4

Bkg horizons

Hue: 10YR or 2.5Y

Value: 3 to 6 moist; 5 to 7 dry

Texture: Loam, clay loam, or silt loam

Clay content: 20 to 30 percent

Content of rock fragments: 0 to 10 percent pebbles

Calcium carbonate equivalent: 15 to 35 percent

Reaction: pH 7.4 to 8.4

Cg1 horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 moist; 5 or 6 dry

Chroma: 2 to 4

Texture: Loam, clay loam, or silty clay loam

Clay content: 20 to 30 percent

Content of rock fragments: 0 to 30 percent—0 to 10 percent cobbles; 0 to 20 percent pebbles

Reaction: pH 6.6 to 7.3

Cg2 horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 moist; 5 or 6 dry

Texture: Loam or sandy loam

Clay content: 18 to 27 percent

Content of rock fragments: 15 to 35 percent—0 to 10 percent cobbles; 15 to 25 percent pebbles

Reaction: pH 6.6 to 7.3

635B—Tetonview loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 3,600 to 6,000 feet

Mean annual precipitation: 10 to 19 inches

Frost-free period: 70 to 105 days

Composition

Major Components

Tetonview and similar soils: 85 percent

Minor Components

Nythar and similar soils: 0 to 4 percent

Poronto and similar soils: 0 to 4 percent

Mannixlee and similar soils: 0 to 4 percent

Saypo and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Apparent

Available water capacity: Mainly 9.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Tewfel Series

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Sedimentary plains and hills

Parent material: Material derived from semiconsolidated shale

Slope range: 4 to 35 percent

Elevation range: 3,600 to 6,000 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Typic Haplustolls

Typical Pedon

Tewfel clay loam, in an area of Tewfel-Hackney complex, 4 to 15 percent slopes, in an area of rangeland, 1,850 feet north and 1,900 feet east of the southwest corner of sec. 34, T. 11 N., R. 12 W.

Ap—0 to 7 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; hard, very friable, moderately sticky, moderately plastic; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear smooth boundary.

A—7 to 12 inches; grayish brown (2.5Y 5/2) clay loam, very dark grayish brown (2.5Y 3/2) moist; weak medium subangular blocky structure; hard, very friable, moderately sticky, moderately plastic; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear smooth boundary.

Bw1—12 to 21 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; very hard, friable, moderately sticky, moderately plastic; many very fine and fine roots; common very fine tubular pores; neutral; clear smooth boundary.

2Bw2—21 to 30 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak fine subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; few very fine and fine roots; few very fine tubular pores; neutral; clear smooth boundary.

Cr—30 to 60 inches; semiconsolidated shale.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 10 to 15 inches

Depth to the Cr horizon: 20 to 40 inches

A horizons

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 27 to 35 percent

Reaction: pH 6.6 to 7.3

Bw1 horizon

Value: 5 or 6 dry; 3 or 4 moist

Chroma: 2 or 3

Clay content: 27 to 35 percent

Reaction: pH 6.6 to 7.3

2Bw2 horizon

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: Silty clay, clay loam, or loam

Clay content: 25 to 45 percent

Content of rock fragments: 0 to 10 percent channers

Reaction: pH 6.6 to 7.3

**59D—Tewfel-Hackney complex,
4 to 15 percent slopes****Setting****Landform:**

- Tewfel—Sedimentary plains and hills
- Hackney—Sedimentary plains and hills

Position on landform:

- Tewfel—Foothills and toeslopes
- Hackney—Foothills and toeslopes

Slope:

- Tewfel—4 to 15 percent
- Hackney—4 to 15 percent

Elevation: 3,600 to 6,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition**Major Components**

Tewfel and similar soils: 50 percent

Hackney and similar soils: 35 percent

Minor Components

Tewfel, greater slope: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Winspect and similar soils: 0 to 5 percent

Major Component Description**Tewfel**

Surface layer texture: Clay loam

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.1 inches

Hackney

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

59E—Tewfel-Hackney complex, 15 to 35 percent slopes

Setting

Landform:

- Tewfel—Hills
- Hackney—Hills

Position on landform:

- Tewfel—Backslopes and footslopes
- Hackney—Backslopes and footslopes

Slope:

- Tewfel—15 to 35 percent
- Hackney—15 to 35 percent

Elevation: 3,600 to 6,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Tewfel and similar soils: 50 percent
 Hackney and similar soils: 35 percent

Minor Components

Tewfel, greater slope: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent
 Winspect and similar soils: 0 to 5 percent

Major Component Description

Tewfel

Surface layer texture: Clay loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.1 inches

Hackney

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

859E—Tewfel-Hackney-Shale outcrop complex, 15 to 35 percent slopes

Setting

Landform:

- Tewfel—Hills
- Hackney—Hills
- Shale outcrop—Sedimentary plains

Position on landform:

- Tewfel—Backslopes and footslopes
- Hackney—Backslopes and footslopes

Slope:

- Tewfel—15 to 35 percent
- Hackney—8 to 15 percent

Elevation: 3,600 to 6,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Tewfel and similar soils: 40 percent
 Hackney and similar soils: 25 percent
 Shale outcrop: 20 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
 Winspect and similar soils: 0 to 5 percent
 Windham and similar soils: 0 to 5 percent

Major Component Description

Tewfel

Surface layer texture: Clay loam
Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.1 inches

Hackney

Surface layer texture: Loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Semiconsolidated shale residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.2 inches

Shale outcrop

Definition: Areas of shale bedrock outcrop exposed

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Tibson Series

Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Permeability: Moderately slow
Landform: Mountains
Parent material: Colluvium or residuum
Slope range: 2 to 60 percent
Elevation range: 5,800 to 7,200 feet
Annual precipitation: 15 to 22 inches
Annual air temperature: 34 to 39 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Calcic Haplocryolls

Typical Pedon

Tibson gravelly loam, in an area of Tibson-Levengood gravelly loams, 15 to 35 percent slopes, in an area of rangeland, 1,000 feet south and 1,900 feet west of the northeast corner of sec. 35, T. 6 N., R. 15 W.

- A—0 to 6 inches; very dark grayish brown (10YR 3/2) gravelly loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure parting to weak fine granular; soft, friable, nonsticky, slightly plastic; many very fine and fine roots; few fine interstitial pores; 5 percent cobbles, 25 percent pebbles; slightly acid; clear smooth boundary.
- Bw—6 to 12 inches; brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; soft, friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine tubular pores; 10 percent cobbles, 40 percent pebbles; neutral; clear wavy boundary.
- Bk1—12 to 18 inches; light yellowish brown (10YR 6/4) very gravelly clay loam, yellowish brown (10YR 5/4) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; common very fine tubular pores; 10 percent cobbles, 40 percent pebbles; disseminated lime, few fine masses of lime; common distinct lime casts on underside of coarse fragments; violently effervescent; moderately alkaline; clear smooth boundary.
- Bk2—18 to 24 inches; yellow (10YR 8/6) gravelly loam, brownish yellow (10YR 6/6) moist; weak fine subangular blocky structure; soft, friable, slightly sticky, slightly plastic; few very fine roots; few very fine interstitial pores; 10 percent cobbles, 25 percent pebbles; disseminated lime, few fine masses of lime, common distinct lime casts on underside of coarse fragments; violently effervescent; moderately alkaline; clear smooth boundary.
- Bk3—24 to 60 inches; very pale brown (10YR 7/4) very gravelly loam, light yellowish brown (10YR 6/4) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; few very fine roots; few very fine interstitial pores; 15 percent cobbles, 25 percent pebbles; disseminated lime, few fine soft masses of lime; common distinct lime casts on underside of coarse fragments; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 37 to 45 degrees F
Moisture control section: Between 4 and 12 inches
Thickness of the mollic epipedon: 7 to 12 inches
Depth to the calcic horizon: 10 to 12 inches

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: 15 to 35 percent—0 to 10 percent cobbles; 15 to 25 percent pebbles
 Reaction: pH 6.1 to 7.8

Bw horizon

Value: 3 to 5 dry; 2 or 3 moist
 Chroma: 2 or 3
 Clay content: 18 to 27 percent
 Content of rock fragments: 40 to 60 percent—5 to 15 percent cobbles; 35 to 45 percent pebbles
 Reaction: pH 6.6 to 8.4

Bk horizons

Hue: 10YR or 2.5Y
 Value: 5 to 8 dry; 4 to 6 moist
 Chroma: 2 to 6
 Texture: Clay loam, loam, or sandy clay loam
 Clay content: 18 to 30 percent
 Content of rock fragments: 35 to 60 percent—10 to 20 percent cobbles; 25 to 40 percent pebbles
 Calcium carbonate equivalent: 15 to 40 percent
 Reaction: pH 7.9 to 8.4

76B—Tibson gravelly loam, 2 to 4 percent slopes

Setting

Landform: Mountains
Position on landform: Toeslopes
Slope: 2 to 4 percent, southeast aspect
Elevation: 5,800 to 7,200 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Tibson and similar soils: 85 percent

Minor Components

Levengood and similar soils: 0 to 5 percent
 Lap and similar soils: 0 to 5 percent
 Maciver and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Colluvium or residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

76D—Tibson gravelly loam, 4 to 15 percent slopes

Setting

Landform: Mountains
Position on landform: Footslopes and toeslopes
Slope: 4 to 15 percent, southeast aspect
Elevation: 5,800 to 7,200 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Tibson and similar soils: 85 percent

Minor Components

Maciver and similar soils: 0 to 5 percent
 Lap and similar soils: 0 to 5 percent
 Levengood and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Colluvium or residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

76E—Tibson gravelly loam, 15 to 35 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent, southeast aspect

Elevation: 5,800 to 7,200 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Tibson and similar soils: 85 percent

Minor Components

Maciver and similar soils: 0 to 5 percent

Lap and similar soils: 0 to 5 percent

Levengood and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Colluvium or residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

76F—Tibson gravelly loam, 35 to 60 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and shoulders

Slope: 35 to 60 percent, southeast aspect

Elevation: 5,800 to 7,200 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Tibson and similar soils: 85 percent

Minor Components

Levengood and similar soils: 0 to 5 percent

Lap and similar soils: 0 to 5 percent

Maciver and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Colluvium or residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

176C—Tibson-Levengood gravelly loams, 4 to 8 percent slopes

Setting

Landform:

- Tibson—Mountains
- Levengood—Mountains

Position on landform:

- Tibson—Toeslopes
- Levengood—Toeslopes

Slope:

- Tibson—4 to 8 percent, southeast aspect
- Levengood—4 to 8 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Tibson and similar soils: 55 percent

Levengood and similar soils: 30 percent

Minor Components

Libeg and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Maciver and similar soils: 0 to 5 percent

Major Component Description

Tibson

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Colluvium or residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.3 inches

Levengood

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Colluvium or residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

176D—Tibson-Levengood gravelly loams, 8 to 15 percent slopes

Setting

Landform:

- Tibson—Mountains
- Levengood—Mountains

Position on landform:

- Tibson—Foothills and toeslopes
- Levengood—Foothills and toeslopes

Slope:

- Tibson—8 to 15 percent, southeast aspect
- Levengood—8 to 15 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Tibson and similar soils: 55 percent

Levengood and similar soils: 30 percent

Minor Components

Libeg and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Maciver and similar soils: 0 to 5 percent

Major Component Description

Tibson

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Colluvium or residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.3 inches

Levengood

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Colluvium or residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

176E—Tibson-Levengood gravelly loams, 15 to 35 percent slopes

Setting

Landform:

- Tibson—Mountains
- Levengood—Mountains

Position on landform:

- Tibson—Backslopes and footslopes
- Levengood—Backslopes and footslopes

Slope:

- Tibson—15 to 35 percent, southeast aspect
- Levengood—15 to 35 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Tibson and similar soils: 55 percent

Levengood and similar soils: 30 percent

Minor Components

Libeg and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Maciver and similar soils: 0 to 5 percent

Major Component Description

Tibson

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Colluvium or residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.3 inches

Levengood

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Colluvium or residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

176F—Tibson-Levengood gravelly loams, 35 to 60 percent slopes

Setting

Landform:

- Tibson—Mountains
- Levengood—Mountains

Position on landform:

- Tibson—Backslopes and shoulders
- Levengood—Backslopes and shoulders

Slope:

- Tibson—35 to 60 percent, southeast aspect
- Levengood—35 to 60 percent

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Tibson and similar soils: 55 percent

Levengood and similar soils: 30 percent

Minor Components

Libeg and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Maciver and similar soils: 0 to 5 percent

Major Component Description

Tibson

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Colluvium or residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.3 inches

Levengood

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Colluvium or residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Tolbert Series

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Mountains

Parent material: Material derived from fine grained igneous rocks

Slope range: 4 to 60 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Lithic Argiustolls

Typical Pedon

Tolbert gravelly loam, in an area of Braziel-Tolbert gravelly loams, 8 to 15 percent slopes, in an area of rangeland, 600 feet south and 1,700 feet east of the northwest corner of sec. 7, T. 10 N., R. 13 W.

A—0 to 5 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular structure; soft, friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; many very fine and fine irregular pores; 5 percent cobbles and 25 percent pebbles; neutral; clear wavy boundary.

Bt—5 to 12 inches; brown (10YR 5/3) very gravelly clay loam, brown (10YR 4/3) moist; moderate

medium subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; many very fine, fine, and medium roots; many very fine and fine tubular pores; few faint clay films on faces of peds and lining pores; 10 percent cobbles and 30 percent pebbles; neutral.

R—12 inches; rhyolite bedrock.

Range in Characteristics

Soil temperature: 40 to 44 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 10 inches

Depth to bedrock: 10 to 20 inches

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: 25 to 60 percent—0 to 10 percent stones; 5 to 20 percent cobbles; 20 to 30 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 to 4

Texture: Loam or clay loam

Clay content: 20 to 35 percent

Content of rock fragments: 35 to 65 percent—10 to 30 percent cobbles; 25 to 35 percent pebbles

Reaction: pH 6.6 to 7.8

543D—Tolbert-Brazil gravelly loams, 8 to 15 percent slopes

Setting

Landform:

- Tolbert—Mountains
- Brazil—Mountains

Position on landform:

- Tolbert—Foothills and toeslopes
- Brazil—Foothills and toeslopes

Slope:

- Tolbert—8 to 15 percent
- Brazil—8 to 15 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Tolbert and similar soils: 50 percent

Brazil and similar soils: 35 percent

Minor Components

Whitlash and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Shanley and similar soils: 0 to 5 percent

Major Component Description

Tolbert

Surface layer texture: Gravelly loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.1 inches

Brazil

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

543E—Tolbert-Brazil gravelly loams, 15 to 35 percent slopes

Setting

Landform:

- Tolbert—Mountains
- Brazil—Mountains

Position on landform:

- Tolbert—Backslopes and foothills
- Brazil—Backslopes and foothills

Slope:

- Tolbert—15 to 35 percent
- Brazil—15 to 35 percent

Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Tolbert and similar soils: 50 percent
 Braziel and similar soils: 35 percent

Minor Components

Whitlash and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent
 Shanley and similar soils: 0 to 5 percent

Major Component Description

Tolbert

Surface layer texture: Gravelly loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.2 inches

Braziel

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

543F—Tolbert-Braziel gravelly loams, 35 to 60 percent slopes

Setting

Landform:

- Tolbert—Mountains
- Braziel—Mountains

Position on landform:

- Tolbert—Backslopes and shoulders
- Braziel—Backslopes and shoulders

Slope:

- Tolbert—35 to 60 percent
- Braziel—35 to 60 percent

Elevation: 3,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Tolbert and similar soils: 50 percent
 Braziel and similar soils: 35 percent

Minor Components

Whitlash and similar soils: 0 to 4 percent
 Areas of rock outcrop: 0 to 3 percent
 Shanley and similar soils: 0 to 3 percent

Major Component Description

Tolbert

Surface layer texture: Gravelly loam
Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.2 inches

Braziel

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from
 extrusive igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

643E—Tolbert-Braziel-Rock outcrop complex, 15 to 35 percent slopes

Setting

Landform:

- Tolbert—Mountains
- Braziel—Mountains
- Rock outcrop—Mountains

Position on landform:

- Tolbert—Backslopes and footslopes
- Braziel—Backslopes and footslopes

Slope:

- Tolbert—15 to 35 percent
- Braziel—15 to 35 percent

Elevation: 3,600 to 6,200 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days**Composition****Major Components**

Tolbert and similar soils: 40 percent

Braziel and similar soils: 30 percent

Rock outcrop: 15 percent

Minor Components

Shanley and similar soils: 0 to 8 percent

Perma and similar soils: 0 to 7 percent

Major Component Description**Tolbert***Surface layer texture:* Gravelly loam*Depth class:* Shallow (10 to 20 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from
extrusive igneous rocks*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 1.2 inches**Braziel***Surface layer texture:* Gravelly loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from
extrusive igneous rocks*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 5.2 inches**Rock outcrop***Definition:* Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

643F—Tolbert-Braziel-Rock outcrop complex, 35 to 60 percent slopes**Setting***Landform:*

- Tolbert—Mountains
- Braziel—Mountains
- Rock outcrop—Mountains

Position on landform:

- Tolbert—Backslopes and shoulders
- Braziel—Backslopes and shoulders

Slope:

- Tolbert—35 to 60 percent
- Braziel—35 to 60 percent

Elevation: 3,600 to 6,200 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days**Composition****Major Components**

Tolbert and similar soils: 40 percent

Braziel and similar soils: 30 percent

Rock outcrop: 15 percent

Minor Components

Perma and similar soils: 0 to 8 percent

Shanley and similar soils: 0 to 7 percent

Major Component Description**Tolbert***Surface layer texture:* Gravelly loam*Depth class:* Shallow (10 to 20 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from
igneous rocks*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 1.2 inches**Braziel***Surface layer texture:* Gravelly loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from
extrusive igneous rocks*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 5.2 inches**Rock outcrop***Definition:* Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Trapps Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderately slow

Landform: Mountains

Parent material: Colluvium derived from limestone

Slope range: 4 to 80 percent

Elevation range: 3,600 to 6,400 feet

Annual precipitation: 18 to 25 inches

Annual air temperature: 38 to 42 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Typic Haplustalfs

Typical Pedon

Trapps gravelly loam, 15 to 35 percent slopes, in an area of woodland, 1,700 feet north and 300 feet west of the southeast corner of sec. 4, T. 10 N., R. 14 W.

E—0 to 8 inches; light gray (10YR 7/2) gravelly loam, grayish brown (10YR 5/2) moist; weak fine and medium granular structure; slightly hard, very friable, nonsticky, nonplastic; many fine, medium, and coarse roots; many very fine pores; 5 percent cobbles and 20 percent pebbles; neutral; clear wavy boundary.

Bt—8 to 29 inches; yellowish brown (10YR 5/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; moderate fine and medium subangular blocky structure; hard, friable, moderately sticky, moderately plastic; many fine, medium, and coarse roots; many very fine pores; few faint clay films on faces of peds; 10 percent cobbles and 35 percent pebbles; neutral; clear wavy boundary.

Bk1—29 to 42 inches; very pale brown (10YR 7/4) very gravelly loam, yellowish brown (10YR 5/4) moist; moderate medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common fine, medium, and coarse roots; common very fine pores; 15 percent cobbles and 40 percent pebbles; disseminated lime; few fine masses of lime; strongly

effervescent; moderately alkaline; gradual wavy boundary.

Bk2—42 to 60 inches; very pale brown (10YR 7/3) extremely gravelly loam, light yellowish brown (10YR 6/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; few fine, medium, and coarse roots; common very fine pores; 20 percent cobbles and 40 percent pebbles; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 40 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the Bk horizon: 15 to 35 inches

E horizon

Value: 6 or 7 dry; 5 or 6 moist

Chroma: 2 to 4

Clay content: 10 to 15 percent

Content of rock fragments: 20 to 35 percent—5 to 10 percent cobbles and stones; 15 to 25 percent pebbles

Reaction: pH 5.6 to 7.3

Bt horizon

Hue: 7.5YR to 2.5Y

Value: 5 to 7 dry; 3 to 5 moist

Chroma: 2 to 6

Clay content: 27 to 35 percent

Content of rock fragments: 35 to 60 percent—0 to 10 percent cobbles; 35 to 50 percent pebbles

Reaction: pH 6.6 to 8.4

Bk horizons

Hue: 7.5YR to 2.5Y

Value: 6 to 8 dry; 5 or 6 moist

Chroma: 2 to 8

Clay content: 10 to 15 percent

Content of rock fragments: 40 to 70 percent—15 to 30 percent cobbles; 25 to 40 percent pebbles

Calcium carbonate equivalent: 10 to 40 percent
Reaction: pH 7.9 to 8.4

98D—Trapps gravelly loam, 8 to 15 percent slopes

Setting

Landform: Mountains

Position on landform: Footslopes and toeslopes

Slope: 8 to 15 percent, northeast aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Trapps and similar soils: 85 percent

Minor Components

Lap and similar soils: 0 to 3 percent

Areas of rock outcrop: 0 to 3 percent

Silverchief and similar soils: 0 to 5 percent

Whitecow and similar soils: 0 to 4 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

98E—Trapps gravelly loam, 15 to 35 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent, northeast aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Trapps and similar soils: 85 percent

Minor Components

Silverchief and similar soils: 0 to 5 percent

Whitecow and similar soils: 0 to 4 percent

Areas of rock outcrop: 0 to 3 percent

Lap and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

98F—Trapps gravelly loam, 35 to 60 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and shoulders

Slope: 35 to 60 percent, northeast aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Trapps and similar soils: 85 percent

Minor Components

Silverchief and similar soils: 0 to 5 percent

Whitecow and similar soils: 0 to 4 percent

Lap and similar soils: 0 to 3 percent

Areas of rock outcrop: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

98G—Trapps gravelly loam, 60 to 80 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and shoulders

Slope: 60 to 80 percent, northeast aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Trapps and similar soils: 85 percent

Minor Components

Whitecow and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 4 percent

Silverchief and similar soils: 0 to 3 percent

Lap and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

198C—Trapps-Yreka complex, 4 to 8 percent slopes

Setting

Landform:

- Trapps—Mountains
- Yreka—Mountains

Position on landform:

- Trapps—Toeslopes
- Yreka—Toeslopes

Slope:

- Trapps—4 to 8 percent
- Yreka—4 to 8 percent

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Trapps and similar soils: 45 percent

Yreka and similar soils: 40 percent

Minor Components

Bignell and similar soils: 0 to 5 percent

Soils with a bouldery surface layer: 0 to 5 percent

Soils with a calcareous surface layer: 0 to 5 percent

Major Component Description

Trapps

Surface layer texture: Stony loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.8 inches

Yreka

Surface layer texture: Stony loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

198E—Trapps-Yreka complex, 8 to 25 percent slopes

Setting

Landform:

- Trapps—Mountains
- Yreka—Mountains

Position on landform:

- Trapps—Backslopes and shoulders
- Yreka—Backslopes and footslopes

Slope:

- Trapps—8 to 25 percent
- Yreka—8 to 25 percent

Elevation: 3,600 to 6,400 feet*Mean annual precipitation:* 18 to 25 inches*Frost-free period:* 70 to 90 days**Composition****Major Components**

Trapps and similar soils: 45 percent

Yreka and similar soils: 40 percent

Minor Components

Bignell and similar soils: 0 to 5 percent

Soils with a bouldery surface layer: 0 to 5 percent

Soils with a calcareous surface layer: 0 to 5 percent

Major Component Description**Trapps***Surface layer texture:* Stony loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Limestone colluvium*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 5.8 inches**Yreka***Surface layer texture:* Stony loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from igneous rocks*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Truchot Series*Depth class:* Very deep (more than 60 inches)*Drainage class:* Somewhat poorly drained*Permeability:* Moderately slow*Landform:* Alluvial fans and stream terraces*Parent material:* Calcareous alluvium*Slope range:* 0 to 4 percent*Elevation range:* 3,600 to 5,400 feet*Annual precipitation:* 12 to 14 inches*Annual air temperature:* 39 to 44 degrees F*Frost-free period:* 90 to 105 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Aquic Calciustolls

Typical Pedon

Truchot loam, 0 to 4 percent slopes, in an area of irrigated hayland, 4,400 feet north and 600 feet west of the southeast corner of sec. 24, T. 10 N., R. 13 W.

Oe—1 inch to 0; partially decomposed organic matter.

A—0 to 7 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine and few medium roots; common very fine tubular pores; slightly effervescent; moderately alkaline; gradual wavy boundary.

Bk1—7 to 15 inches; brown (10YR 5/3) loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine roots; common fine and medium tubular pores; disseminated lime; few fine masses of lime; slightly effervescent; moderately alkaline; clear wavy boundary.

Bk2—15 to 26 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine roots; few very fine tubular pores; 10 percent cobbles and 30 percent pebbles; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

Bk3—26 to 60 inches; light gray (10YR 7/2) very gravelly loam; pale brown (10YR 6/3) moist; few fine distinct reddish yellow (7.5YR 6/8) redox concentrations; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; few very fine roots; few fine tubular pores; 15 percent cobbles and 35 percent pebbles; few fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics*Soil temperature:* 41 to 46 degrees F*Moisture control section:* Between 4 and 12 inches*Thickness of the mollic epipedon:* 7 to 10 inches

Depth to the Bk horizon: 5 to 15 inches
Depth to the seasonal high water table: 24 to 42 inches

A horizon

Value: 2 or 3 moist; 3 or 4 dry
 Chroma: 1 or 2
 Clay content: 20 to 27 percent
 Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles
 Calcium carbonate equivalent: 5 to 10 percent
 Reaction: pH 7.4 to 8.4

Bk1 horizon

Hue: 10YR or 2.5Y
 Value: 3 or 4 moist; 5 or 6 dry
 Chroma: 1 to 3
 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: 10 to 35 percent
 Reaction: pH 7.9 to 8.4

Bk2 horizon

Hue: 10YR or 2.5Y
 Value: 4 to 7 moist; 6 to 8 dry
 Chroma: 1 to 3
 Texture: Loam or clay loam
 Clay content: 20 to 35 percent
 Content of rock fragments: 35 to 50 percent—5 to 10 percent cobbles; 30 to 40 percent pebbles
 Calcium carbonate equivalent: 15 to 35 percent
 Reaction: pH 7.9 to 8.4

Bk3 horizon

Hue: 10YR or 2.5Y
 Value: 4 to 6 moist; 6 to 8 dry
 Chroma: 1 to 3
 Texture: Loam, clay loam, or sandy clay loam
 Clay content: 15 to 30 percent
 Content of rock fragments: 40 to 60 percent—10 to 15 percent cobbles; 30 to 45 percent pebbles
 Calcium carbonate equivalent: 10 to 30 percent
 Reaction: pH 7.9 to 8.4

537B—Truchot loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Treads
Slope: 0 to 4 percent

Elevation: 3,600 to 5,400 feet
Mean annual precipitation: 12 to 14 inches
Frost-free period: 90 to 105 days

Composition**Major Components**

Truchot and similar soils: 85 percent

Minor Components

Poronto and similar soils: 0 to 5 percent
 Kleinschmidt and similar soils: 0 to 5 percent
 Sixbeacon and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat poorly drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Apparent
Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Turrah Series

Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Permeability: Slow
Landform: Alluvial fans and stream terraces
Parent material: Alluvium
Slope range: 0 to 4 percent
Elevation range: 3,600 to 6,000 feet
Annual precipitation: 15 to 19 inches
Annual air temperature: 39 to 44 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Fine, mixed, superactive, frigid
 Cumulic Endoaquolls

Typical Pedon

Turrah silty clay loam, 0 to 4 percent slopes, in an area of pasture, 2,250 feet north and 750 feet west of the southeast corner of sec. 24, T. 11 N., R. 15 W.

A1—0 to 5 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; strong medium

granular structure; slightly hard, firm, moderately sticky, moderately plastic; many very fine and fine roots; few very fine tubular pores; neutral; clear smooth boundary.

A2—5 to 15 inches; black (10YR 2/1) silty clay, very dark gray (10YR 3/1) dry; common fine distinct yellowish red (5YR 5/6) and reddish yellow (5YR 6/6) dry redox concentrations; moderate medium subangular blocky structure; very hard, very firm, moderately sticky, moderately plastic; many very fine and fine roots; few very fine tubular pores; neutral; clear smooth boundary.

Bg1—15 to 25 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; common medium distinct yellowish red (5YR 5/6) and reddish yellow (5YR 6/6) dry redox concentrations; moderate fine subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; common very fine and fine roots; few very fine tubular pores; neutral; gradual wavy boundary.

Bg2—25 to 47 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; many very fine and fine prominent yellowish red (5YR 5/6) and reddish yellow (5YR 6/6) dry redox concentrations; weak medium subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; few very fine and fine roots; few fine tubular pores; neutral; gradual wavy boundary.

2Cg—47 to 60 inches; olive gray (5Y 4/2) very gravelly sandy clay loam, gray (5Y 5/1) dry; many very fine and fine prominent yellowish red (5YR 5/6) and reddish yellow (5YR 6/6) dry redox concentrations; massive; very hard, very firm, moderately sticky, moderately plastic; few very fine and fine roots; few fine tubular pores; 15 percent cobbles and 25 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 24 to 48 inches

Depth to the seasonal high water table: 12 to 24 inches

A horizons

Hue: 10YR or 2.5Y

Value: 2 or 3 moist; 2 or 3 dry

Chroma: 1 or 2

Texture: Silty clay loam or silty clay

Clay content: 27 to 60 percent

Reaction: pH 5.6 to 7.3

Bg horizons

Hue: 10YR or 2.5Y

Value: 2 or 3 moist; 4 or 5 dry

Chroma: 1 or 2

Redox concentrations: 5YR 5/6 and 5YR 6/6

Texture: Silty clay loam, clay loam, or clay

Clay content: 35 to 60 percent

Reaction: pH 6.6 to 7.8

2Cg horizon

Hue: 5Y or 2.5Y

Value: 4 or 5 moist; 4 to 6 dry

Chroma: 1 or 2

Redox concentrations: 5YR 5/6 and 5YR 6/6

Texture: Sandy clay loam, clay loam, or sandy loam

Clay content: 20 to 40 percent

Content of rock fragments: 35 to 85 percent—15 to 35 percent cobbles; 20 to 50 percent pebbles

Reaction: pH 6.6 to 7.8

649B—Turrah silty clay loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 3,600 to 6,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Turrah and similar soils: 85 percent

Minor Components

Poronto and similar soils: 0 to 5 percent

Nythar and similar soils: 0 to 5 percent

Marcott and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Silty clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Apparent

Available water capacity: Mainly 8.4 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Varney Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Alluvial fans and stream terraces

Parent material: Alluvium

Slope range: 0 to 35 percent

Elevation range: 4,000 to 6,400 feet

Annual precipitation: 10 to 14 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 90 to 105 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Calcic Argiustolls

Typical Pedon

Varney loam, in an area of Varney-Con loams, 0 to 4 percent slopes, in an area of hayland, 75 feet south and 200 feet west of the northeast corner of sec. 29, T. 10 N., R. 13 W.

Ap—0 to 7 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and very fine roots; many fine and very fine interstitial pores; neutral; clear smooth boundary.

Bt—7 to 14 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 4/4) moist; weak medium prismatic structure; hard, firm, slightly sticky, moderately plastic; many fine and very fine roots; many very fine and fine interstitial pores; few faint clay films on faces of peds; neutral; clear smooth boundary.

Bk1—14 to 22 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; weak fine granular structure; soft, friable, slightly sticky, slightly plastic; many fine and very fine roots; many fine and very fine interstitial pores; few fine masses of lime; violently effervescent; slightly alkaline; gradual wavy boundary.

Bk2—22 to 34 inches; very pale brown (10YR 7/4) loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, friable, slightly sticky, moderately plastic; few fine and very fine roots; many fine and very fine interstitial pores; disseminated lime; few fine

masses of lime; violently effervescent; slightly alkaline; gradual wavy boundary.

BC—34 to 60 inches; very pale brown (10YR 7/3) sandy loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; few fine and very fine roots; many fine and very fine interstitial pores; disseminated lime; violently effervescent; slightly alkaline.

Range in Characteristics

Soil temperature: 40 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 16 inches

Depth to the Bk horizon: 9 to 20 inches

Ap horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Texture: Loam or clay loam

Clay content: 18 to 30 percent

Content of rock fragments: 0 to 15 percent pebbles

Reaction: pH 6.6 to 7.3

Bt horizon

Hue: 10YR or 2.5Y

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 4

Clay content: 27 to 35 percent

Content of rock fragments: 0 to 15 percent pebbles

Reaction: pH 6.6 to 7.8

Bk horizons

Hue: 10YR or 2.5Y

Value: 5 to 8 dry; 4 to 7 moist

Chroma: 2 to 4

Texture: Clay loam or loam

Clay content: 10 to 30 percent

Content of rock fragments: 0 to 15 percent pebbles

Calcium carbonate equivalent: 15 to 30 percent

Reaction: pH 7.4 to 8.4

BC horizon

Hue: 7.5YR to 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4

Clay content: 5 to 15 percent

Content of rock fragments: 0 to 15 percent pebbles

Calcium carbonate equivalent: 1 to 15 percent

Reaction: pH 7.4 to 8.4

31B—Varney clay loam, 0 to 4 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 0 to 4 percent
Elevation: 4,000 to 6,000 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Composition

Major Components

Varney and similar soils: 85 percent

Minor Components

Anaconda and similar soils: 0 to 5 percent
 Con and similar soils: 0 to 5 percent
 Sixbeacon and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

31C—Varney clay loam, 4 to 8 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 4,000 to 6,000 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Composition

Major Components

Varney and similar soils: 85 percent

Minor Components

Anaconda and similar soils: 0 to 5 percent
 Con and similar soils: 0 to 5 percent
 Sixbeacon and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

31D—Varney clay loam, 8 to 15 percent slopes

Setting

Landform: Alluvial fans and stream terraces
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 4,000 to 6,000 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Composition

Major Components

Varney and similar soils: 85 percent

Minor Components

Anaconda and similar soils: 0 to 5 percent
 Con and similar soils: 0 to 5 percent
 Sixbeacon and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.9 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

36B—Varney-Con loams, 0 to 4 percent slopes

Setting

Landform:

- Varney—Alluvial fans and stream terraces
- Con—Alluvial fans and stream terraces

Position on landform:

- Varney—Toeslopes
- Con—Toeslopes

Slope:

- Varney—0 to 4 percent
- Con—0 to 4 percent

Elevation: 4,000 to 6,000 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Varney and similar soils: 60 percent

Con and similar soils: 25 percent

Minor Components

Soils that are clayey throughout: 0 to 5 percent

Sixbeacon and similar soils: 0 to 4 percent

Anaconda and similar soils: 0 to 3 percent

Rothiemay and similar soils: 0 to 3 percent

Major Component Description

Varney

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.1 inches

Con

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

36C—Varney-Con loams, 4 to 8 percent slopes

Setting

Landform:

- Varney—Alluvial fans and stream terraces
- Con—Alluvial fans and stream terraces

Position on landform:

- Varney—Toeslopes
- Con—Toeslopes

Slope:

- Varney—4 to 8 percent
- Con—4 to 8 percent

Elevation: 4,000 to 6,000 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Varney and similar soils: 60 percent

Con and similar soils: 25 percent

Minor Components

Soils that are clayey throughout: 0 to 5 percent

Sixbeacon and similar soils: 0 to 4 percent

Anaconda and similar soils: 0 to 3 percent

Rothiemay and similar soils: 0 to 3 percent

Major Component Description

Varney

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.1 inches

Con

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

36D—Varney-Con loams, 8 to 15 percent slopes

Setting

Landform:

- Varney—Alluvial fans and stream terraces
- Con—Alluvial fans and stream terraces

Position on landform:

- Varney—Foothills and toeslopes
- Con—Foothills and toeslopes

Slope:

- Varney—8 to 15 percent
- Con—8 to 15 percent

Elevation: 4,000 to 6,000 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Varney and similar soils: 60 percent

Con and similar soils: 25 percent

Minor Components

Soils that are clayey throughout: 0 to 5 percent

Sixbeacon and similar soils: 0 to 4 percent

Anaconda and similar soils: 0 to 3 percent

Rothiemay and similar soils: 0 to 3 percent

Major Component Description

Varney

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.1 inches

Con

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

36E—Varney-Con loams, 15 to 35 percent slopes

Setting

Landform:

- Varney—Alluvial fans and stream terraces
- Con—Alluvial fans and stream terraces

Position on landform:

- Varney—Backslopes and foothills
- Con—Backslopes and foothills

Slope:

- Varney—15 to 35 percent
- Con—15 to 35 percent

Elevation: 4,000 to 6,400 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Varney and similar soils: 60 percent

Con and similar soils: 25 percent

Minor Components

Soils that are clayey throughout: 0 to 5 percent

Sixbeacon and similar soils: 0 to 4 percent

Anaconda and similar soils: 0 to 3 percent

Rothiemay and similar soils: 0 to 3 percent

Major Component Description

Varney

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.1 inches

Con

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.8 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Waldbillig Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Moraines

Parent material: Glacial till

Slope range: 2 to 25 percent

Elevation range: 6,500 to 7,500 feet

Annual precipitation: 30 to 40 inches

Annual air temperature: 37 to 42 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Andic Eutrocryepts

Typical Pedon

Waldbillig gravelly loam, cool, 2 to 8 percent slopes, in an area of forest land, 800 feet south and 400 feet west of the northeast corner of sec. 9, T. 4 N., R. 13 W. (Deer Lodge County, Montana)

Oi—2 inches to 0; slightly decomposed forest litter.

A—0 to 8 inches; yellowish brown (10YR 5/4) gravelly loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine, fine, and medium roots; many fine interstitial pores; 15 percent pebbles and 5 percent cobbles; moderately acid; clear wavy boundary.

2E—8 to 19 inches; pale brown (10YR 6/3) very cobbly sandy loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine and fine and few medium roots; common fine pores; 20 percent pebbles and 30 percent cobbles; moderately acid; clear wavy boundary.

2E and Bt1—19 to 31 inches; E part (80 percent) is light yellowish brown (2.5Y 6/4) very cobbly sandy loam, light olive brown (2.5Y 5/4) moist;

B part (20 percent) is brown (7.5YR 5/4) very cobbly fine sandy loam lamellae 1/8- to 1/4-inch thick (7.5YR 4/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine and few medium and fine roots; common fine pores; 25 percent pebbles and 30 percent cobbles; slightly acid; clear wavy boundary.

2E and Bt2—31 to 60 inches; E part (90 percent) is light brownish gray (2.5Y 6/2) very cobbly sandy loam, dark grayish brown (2.5Y 4/2) moist; B part (10 percent) is brown (7.5YR 5/4) very cobbly sandy loam lamellae 1/4- to 1/2-inch thick, dark brown (7.5YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; few very fine, fine, and medium roots; common fine pores; 25 percent pebbles and 30 percent cobbles; slightly acid.

Range in Characteristics

Soil temperature: 39 to 44 degrees F

Moisture control section: Between 8 and 24 inches

A horizon

Hue: 7.5YR or 10YR

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 3 or 4

Clay content: 5 to 15 percent

Content of rock fragments: 15 to 35 percent—0 to 10 percent cobbles, stones, and boulders; 15 to 25 percent pebbles

Reaction: pH 5.6 to 6.5

Moist bulk density: 0.95 g/cm³ or less

2E horizon

Hue: 5YR, 7.5YR or 10YR

Value: 6 or 7 dry; 4 to 6 moist

Chroma: 2 or 3

Texture: Fine sandy loam or sandy loam

Clay content: 7 to 18 percent

Content of rock fragments: 35 to 60 percent—5 to 10 percent cobbles, stones, and boulders; 30 to 50 percent pebbles

Reaction: pH 5.6 to 6.5

2E and Bt horizons

Hue: E part—5YR, 7.5YR, 10YR, or 2.5Y;

B part—5YR or 7.5YR

Value: E part—5 to 7 dry, 4 to 6 moist; B part—5 or 6 dry, 3 or 4 moist

Chroma: E part—2 to 4; B part—2 to 4

Texture, mixed: Fine sandy loam, sandy loam, or loam

Clay content: 7 to 18 percent—lamellae has less than 3 percent clay increase

Content of rock fragments: 35 to 60 percent—
10 to 30 percent cobbles, stones, and
boulders; 25 to 30 percent pebbles
Reaction: pH 6.1 to 7.3

**497C—Waldbillig gravelly loam, cool,
2 to 8 percent slopes**

Setting

Landform: Mountains
Slope: 2 to 8 percent
Elevation: 6,500 to 7,500 feet
Mean annual precipitation: 30 to 40 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Waldbillig and similar soils: 85 percent

Minor Components

Worock and similar soils: 0 to 3 percent
Helmville and similar soils: 0 to 3 percent
Rumsey and similar soils: 0 to 3 percent
Evaro and similar soils: 0 to 3 percent
Elve and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alpine till or glacial drift
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

**497E—Waldbillig gravelly loam, cool,
8 to 25 percent slopes**

Setting

Landform: Mountains
Slope: 8 to 25 percent
Elevation: 6,500 to 7,500 feet
Mean annual precipitation: 30 to 40 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Waldbillig and similar soils: 85 percent

Minor Components

Worock and similar soils: 0 to 3 percent
Helmville and similar soils: 0 to 3 percent
Rumsey and similar soils: 0 to 3 percent
Evaro and similar soils: 0 to 3 percent
Elve and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Alpine till or glacial drift
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

W—Water

Composition

Major Components

Water: 100 percent

Major Component Description

Definition: Areas of open water

915—Welded tuff

Composition

Major Components

Welded tuff: 100 percent

Major Component Description

Definition: Areas of exposed consolidated pumice

Whitecow Series

Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Permeability: Moderate

Landform: Mountains

Parent material: Colluvium derived from limestone

Slope range: 15 to 80 percent

Elevation range: 4,400 to 6,200 feet

Annual precipitation: 18 to 25 inches

Annual air temperature: 38 to 42 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, carbonatic, frigid
Typic Calcustepts

Typical Pedon

Whitecow gravelly loam, cool, 35 to 60 percent slopes, in an area of woodland, 1,200 feet north and 1,500 feet west of the southeast corner of sec. 15, T. 11 N., R. 12 W.

A—0 to 4 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, slightly plastic; many very fine and fine and common medium and coarse roots; many very fine and fine irregular pores; 20 percent pebbles; strongly effervescent; moderately alkaline; clear smooth boundary.

Bk1—4 to 9 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 4/3) moist; weak fine subangular blocky structure parting to moderate medium granular; soft, very friable, slightly sticky, slightly plastic; many very fine and fine and common medium and coarse roots; 10 percent cobbles and 35 percent pebbles; few fine masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

Bk2—9 to 34 inches; light gray (10YR 7/2) very gravelly loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; hard, very friable, slightly sticky, slightly plastic; common very fine and fine roots; 10 percent cobbles and 40 percent pebbles; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk3—34 to 60 inches; white (10YR 8/2) extremely gravelly loam, yellowish brown (10YR 5/4) moist; weak fine subangular blocky structure; hard, very friable, slightly sticky, slightly plastic; common very fine and fine roots; 10 percent cobbles and 60 percent pebbles; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 38 to 42 degrees F

Moisture control section: Between 4 and 12 inches

A horizon

Value: 4 to 6 dry; 3 or 4 moist

Chroma: 2 or 3

Clay content: 18 to 27 percent

Content of rock fragments: 15 to 35 percent—0 to 10 percent cobbles; 15 to 25 percent pebbles
Reaction: pH 7.4 to 8.4

Bk1 horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 2 to 4

Clay content: 18 to 27 percent

Content of rock fragments: 35 to 60 percent—0 to 10 percent cobbles; 35 to 50 percent pebbles
Calcium carbonate equivalent: 40 to 50 percent
Reaction: pH 7.4 to 8.4

Bk2 horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 2 to 4

Clay content: 18 to 27 percent

Content of rock fragments: 45 to 65 percent—10 to 15 percent cobbles; 35 to 50 percent pebbles

Calcium carbonate equivalent: 40 to 50 percent
Reaction: pH 7.4 to 9.0

Bk3 horizon

Hue: 10YR or 2.5Y

Value: 6 to 8 dry; 4 to 7 moist

Chroma: 2 to 6

Clay content: 18 to 27 percent

Content of rock fragments: 60 to 80 percent—5 to 15 percent cobbles; 55 to 65 percent pebbles
Calcium carbonate equivalent: 40 to 50 percent
Reaction: pH 7.4 to 9.0

88E—Whitecow gravelly loam, 15 to 35 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent, southwest aspect

Elevation: 4,400 to 6,200 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Whitecow and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
 Trapps and similar soils: 0 to 5 percent
 Lap and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

88F—Whitecow gravelly loam, 35 to 60 percent slopes**Setting**

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent, southwest aspect
Elevation: 4,400 to 6,200 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Whitecow and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
 Trapps and similar soils: 0 to 5 percent
 Lap and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

88G—Whitecow gravelly loam, 60 to 80 percent slopes**Setting**

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 60 to 80 percent, southwest aspect
Elevation: 4,400 to 6,200 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Whitecow and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 7 percent
 Lap and similar soils: 0 to 5 percent
 Trapps and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

488E—Whitecow gravelly loam, cool, 15 to 35 percent slopes**Setting**

Landform: Mountains
Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent, northeast aspect
Elevation: 4,400 to 6,200 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Whitecow and similar soils: 85 percent

Minor Components

Lap and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent
 Trapps and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

488F—Whitecow gravelly loam, cool, 35 to 60 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent, northeast aspect
Elevation: 4,400 to 6,200 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Whitecow and similar soils: 85 percent

Minor Components

Lap and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent
 Trapps and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)

Drainage class: Well drained
Dominant parent material: Limestone colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

488G—Whitecow gravelly loam, cool, 60 to 80 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 60 to 80 percent
Elevation: 4,400 to 6,200 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Whitecow and similar soils: 85 percent

Minor Components

Lap and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 7 percent
 Trapps and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

788E—Whitecow, cool-Rock outcrop complex, 15 to 35 percent slopes

Setting

Landform:

- Whitecow—Mountains
- Rock outcrop—Mountains

Position on landform: Backslopes and shoulders

Slope: 15 to 35 percent

Elevation: 4,400 to 6,200 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Whitecow and similar soils: 65 percent
Rock outcrop: 20 percent

Minor Components

Trapps and similar soils: 0 to 5 percent
Lap and similar soils: 0 to 5 percent
Yreka and similar soils: 0 to 5 percent

Major Component Description

Whitecow

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.6 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

788F—Whitecow, cool-Rock outcrop complex, 35 to 60 percent slopes

Setting

Landform:

- Whitecow—Mountains
- Rock outcrop—Mountains

Position on landform: Backslopes and shoulders

Slope: 35 to 60 percent, northeast aspect

Elevation: 4,400 to 6,200 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Whitecow and similar soils: 65 percent
Rock outcrop: 20 percent

Minor Components

Trapps and similar soils: 0 to 5 percent
Lap and similar soils: 0 to 5 percent
Yreka and similar soils: 0 to 5 percent

Major Component Description

Whitecow

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.6 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

788G—Whitecow, cool-Rock outcrop complex, 60 to 80 percent slopes

Setting

Landform:

- Whitecow—Mountains
 - Rock outcrop—Mountains
- Position on landform:* Backslopes and shoulders

Slope: 60 to 80 percent

Elevation: 4,400 to 6,200 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Whitecow and similar soils: 65 percent
Rock outcrop: 20 percent

Minor Components

Trapps and similar soils: 0 to 5 percent

Lap and similar soils: 0 to 5 percent

Yreka and similar soils: 0 to 5 percent

Major Component Description**Whitecow**

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.6 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

988E—Whitecow-Rock outcrop complex, 15 to 35 percent slopes**Setting**

Landform:

- Whitecow—Mountains
- Rock outcrop—Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 4,400 to 6,200 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition**Major Components**

Whitecow and similar soils: 55 percent

Rock outcrop: 30 percent

Minor Components

Trapps and similar soils: 0 to 4 percent

Yreka and similar soils: 0 to 4 percent

Lap and similar soils: 0 to 4 percent

Windham and similar soils: 0 to 3 percent

Major Component Description**Whitecow**

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.6 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

988F—Whitecow-Rock outcrop complex, 35 to 60 percent slopes**Setting**

Landform:

- Whitecow—Mountains
- Rock outcrop—Mountains

Position on landform: Backslopes and shoulders

Slope: 35 to 60 percent, southwest aspect

Elevation: 4,400 to 6,200 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition**Major Components**

Whitecow and similar soils: 55 percent

Rock outcrop: 30 percent

Minor Components

Trapps and similar soils: 0 to 4 percent

Yreka and similar soils: 0 to 4 percent

Lap and similar soils: 0 to 4 percent

Windham and similar soils: 0 to 3 percent

Major Component Description**Whitecow**

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.6 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

988G—Whitecow-Rock outcrop complex, 60 to 80 percent slopes

Setting

Landform:

- Whitecow—Mountains
- Rock outcrop—Mountains

Position on landform: Backslopes and shoulders

Slope: 60 to 80 percent, southwest aspect

Elevation: 4,400 to 6,200 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Whitecow and similar soils: 55 percent

Rock outcrop: 30 percent

Minor Components

Windham and similar soils: 0 to 4 percent

Yreka and similar soils: 0 to 4 percent

Rubble land: 0 to 4 percent

Lap and similar soils: 0 to 3 percent

Major Component Description

Whitecow

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.6 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Whitlash Series

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Mountains

Parent material: Quartzite residuum

Slope range: 15 to 60 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Lithic Haplustolls

Typical Pedon

Whitlash very stony loam, in an area of Perma-Whitlash complex, 35 to 60 percent slopes, in an area of rangeland, 2,150 feet south and 900 feet east of the northwest corner of sec. 17, T. 10 N., R. 13 W.

A—0 to 5 inches; very dark grayish brown (10YR 3/2) very stony loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; many fine interstitial pores; 20 percent stones, 10 percent cobbles and 10 percent pebbles; neutral; clear wavy boundary.

Bw—5 to 14 inches; very dark grayish brown (10YR 3/2) very stony loam, very dark brown (10YR 2/2) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; common fine interstitial pores; 20 percent stones, 10 percent cobbles and 20 percent pebbles; neutral.

R—14 inches; quartzite bedrock.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

Depth to bedrock: 10 to 20 inches

A horizon

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 1 to 3

Clay content: 10 to 27 percent

Content of rock fragments: 35 to 60 percent—

10 to 30 percent stones; 5 to 15 percent

cobbles; 5 to 15 percent pebbles

Reaction: pH 6.1 to 7.3

Bw horizon

Value: 4 or 5 dry; 3 or 4 moist
 Chroma: 2 or 3
 Clay content: 10 to 27 percent
 Content of rock fragments: 35 to 60 percent—
 15 to 25 percent stones; 0 to 10 percent
 cobbles; 20 to 25 percent pebbles
 Reaction: pH 7.4 to 7.8

Whitore Series

Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Permeability: Moderate
Landform: Mountains
Parent material: Colluvium derived from limestone
Slope range: 8 to 80 percent
Elevation range: 5,800 to 7,500 feet
Annual precipitation: 20 to 40 inches
Annual air temperature: 35 to 38 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, carbonatic Typic
 Eutrocrypts

Typical Pedon

Whitore gravelly loam, 35 to 60 percent slopes, in an area of woodland, 500 feet north and 1,300 feet west of the southeast corner of sec. 22, T. 12 N., R. 14 W.

Oi—2 inches to 0; partially decomposed forest litter.

A—0 to 2 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; soft, friable, slightly sticky, slightly plastic; many fine, medium, and coarse roots; 15 percent pebbles; neutral; clear smooth boundary.

Bw1—2 to 8 inches; grayish brown (10YR 5/2) gravelly clay loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; hard, very firm, moderately sticky, moderately plastic; many fine, medium, and coarse roots; many fine and medium tubular pores; 10 percent cobbles and 20 percent pebbles; slightly alkaline; clear wavy boundary.

Bw2—8 to 14 inches; grayish brown (2.5Y 5/2) very gravelly clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; hard, very firm, moderately sticky, moderately plastic; common fine, medium, and coarse roots; common fine tubular pores; 10 percent cobbles and 35 percent pebbles; few faint lime casts on all sides of coarse fragments; slightly effervescent; slightly alkaline; clear wavy boundary.

Bk1—14 to 29 inches; light brownish gray (2.5Y 6/2) very gravelly loam, dark grayish brown (2.5Y 4/2) moist; weak coarse subangular blocky structure; hard, firm, slightly sticky, slightly plastic; common very fine and fine roots; common fine tubular pores; 15 percent cobbles and 35 percent pebbles; common distinct lime casts on all sides of coarse fragments; disseminated lime; violently effervescent; slightly alkaline; gradual wavy boundary.

Bk2—29 to 60 inches; light brownish gray (2.5Y 6/2) very gravelly loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure; slightly hard, friable, slightly sticky, slightly plastic; few fine roots; common fine interstitial pores; 15 percent cobbles and 45 percent pebbles; many prominent lime casts on all sides of coarse fragments; disseminated lime; violently effervescent; slightly alkaline.

Range in Characteristics

Soil temperature: 38 to 42 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the Bk horizon: 5 to 15 inches

A horizon

Value: 4 to 6 dry; 3 or 4 moist

Chroma: 1 to 3

Texture: Loam or clay loam

Clay content: 20 to 35 percent

Content of rock fragments: 15 to 35 percent—0 to 10 cobbles; 15 to 25 percent pebbles

Reaction: 6.6 to 7.8

Bw horizons

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 20 to 30 percent

Content of rock fragments: 30 to 55 percent—10 to 20 percent cobbles; 20 to 35 percent pebbles

Reaction: 7.4 to 7.8

Bk horizons

Hue: 2.5Y or 10YR

Value: 6 to 8 dry; 4 to 7 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 20 to 35 percent

Content of rock fragments: 50 to 75 percent—15 to 30 percent cobbles; 35 to 45 percent pebbles

Calcium carbonate equivalent: 40 to 50 percent
 Reaction: 7.4 to 9.0

92D—Whitore gravelly loam, 8 to 15 percent slopes

Setting

Landform: Mountains
Position on landform: Foothills and toeslopes
Slope: 8 to 15 percent, northeast aspect
Elevation: 5,800 to 7,500 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Whitore and similar soils: 85 percent

Minor Components

Helmville and similar soils: 0 to 5 percent
 Lap and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

92E—Whitore gravelly loam, 15 to 35 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and foothills
Slope: 15 to 35 percent, northeast aspect
Elevation: 5,800 to 7,500 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Whitore and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
 Lap and similar soils: 0 to 5 percent
 Helmville and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

92F—Whitore gravelly loam, 35 to 60 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent, northeast aspect
Elevation: 5,800 to 7,500 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Whitore and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
 Lap and similar soils: 0 to 5 percent
 Helmville and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

92G—Whitore gravelly loam, 60 to 80 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 60 to 80 percent
Elevation: 5,800 to 7,500 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Whitore and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
Lap and similar soils: 0 to 5 percent
Helmville and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

192E—Whitore gravelly clay loam, 15 to 35 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent, northeast aspect
Elevation: 5,800 to 7,500 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Whitore and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 8 percent
Helmville and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Gravelly clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

192F—Whitore gravelly clay loam, 35 to 60 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent, northeast aspect
Elevation: 5,800 to 7,500 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Whitore and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 8 percent
Helmville and similar soils: 0 to 7 percent

Major Component Description

Surface layer texture: Gravelly clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.2 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

992E—Whitore-Rock outcrop complex, 15 to 35 percent slopes

Setting

Landform:

- Whitore—Mountains
- Rock outcrop—Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 5,800 to 7,500 feet

Mean annual precipitation: 20 to 40 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Whitore and similar soils: 45 percent

Rock outcrop: 40 percent

Minor Components

Moderately deep soils: 0 to 4 percent

Whitecow and similar soils: 0 to 4 percent

Helmville and similar soils: 0 to 4 percent

Elve and similar soils: 0 to 3 percent

Major Component Description

Whitore

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.6 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

992F—Whitore-Rock outcrop complex, 35 to 60 percent slopes

Setting

Landform:

- Whitore—Mountains
- Rock outcrop—Mountains

Position on landform: Backslopes and shoulders

Slope: 35 to 60 percent, northeast aspect

Elevation: 5,800 to 7,500 feet

Mean annual precipitation: 20 to 40 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Whitore and similar soils: 45 percent

Rock outcrop: 40 percent

Minor Components

Moderately deep soils: 0 to 4 percent

Whitecow and similar soils: 0 to 4 percent

Helmville and similar soils: 0 to 4 percent

Elve and similar soils: 0 to 3 percent

Major Component Description

Whitore

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.6 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

992G—Whitore-Rock outcrop complex, 60 to 80 percent slopes

Setting

Landform:

- Whitore—Mountains
- Rock outcrop—Mountains

Position on landform: Backslopes and shoulders

Slope: 60 to 80 percent, northeast aspect

Elevation: 5,800 to 7,500 feet

Mean annual precipitation: 20 to 40 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Whitore and similar soils: 45 percent

Rock outcrop: 40 percent

Minor Components

Elve and similar soils: 0 to 4 percent

Helmville and similar soils: 0 to 4 percent

Worock and similar soils: 0 to 4 percent

Rubble land: 0 to 3 percent

Major Component Description

Whitore

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Flooding: None

Available water capacity: Mainly 4.6 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Wimper Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Mountains

Parent material: Colluvium derived from calcareous argillite

Slope range: 2 to 60 percent

Elevation range: 3,800 to 6,000 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Typic Haplustolls

Typical Pedon

Wimper gravelly loam, in an area of Wimper-Winspect complex, 35 to 60 percent slopes, in an area of rangeland, 2,250 feet south and 1,150 feet east of the northwest corner of sec. 15, T. 7 N., R. 15 W.

A—0 to 5 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, slightly plastic; many very fine and fine roots; many very fine irregular pores; 15 percent pebbles; neutral; clear smooth boundary.

Bw1—5 to 8 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine tubular pores; 15 percent pebbles; neutral; clear smooth boundary.

Bw2—8 to 13 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 5/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and common fine roots; common very fine tubular pores; 40 percent pebbles; neutral; clear smooth boundary.

Bk1—13 to 23 inches; very pale brown (10YR 7/3) very gravelly loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots; common fine tubular pores; 5 percent cobbles and 45 percent pebbles; common fine masses of lime; violently effervescent; moderately alkaline; clear wavy boundary.

Bk2—23 to 60 inches; very pale brown (10YR 8/3) very gravelly loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; 15 percent cobbles and 35 percent pebbles; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

Depth to the Bk horizon: 10 to 15 inches

A horizon

Hue: 7.5YR or 10YR

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 to 3
 Clay content: 15 to 27 percent
 Content of rock fragments: 5 to 35 percent—0 to
 10 percent cobbles; 5 to 25 percent pebbles
 Reaction: pH 6.6 to 7.8

Bw horizons

Hue: 7.5YR or 10YR
 Value: 4 to 6 dry; 3 to 5 moist
 Chroma: 2 to 4
 Clay content: 15 to 27 percent
 Content of rock fragments: 15 to 50 percent—0 to
 5 percent cobbles; 15 to 40 percent pebbles
 Reaction: pH 6.6 to 7.8

Bk horizons

Hue: 7.5YR to 2.5Y
 Value: 5 to 8 dry; 4 to 6 moist
 Chroma: 2 or 3
 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: 5 to 15 percent
 Reaction: pH 7.9 to 9.0

29B—Wimper loam, 2 to 4 percent slopes**Setting**

Landform: Mountains
Position on landform: Toeslopes
Slope: 2 to 4 percent
Elevation: 3,800 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Wimper and similar soils: 85 percent

Minor Components

Wimper, greater slope: 0 to 5 percent
 Winspect and similar soils: 0 to 5 percent
 Lap and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Argillite colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

29C—Wimper loam, 4 to 8 percent slopes**Setting**

Landform: Mountains
Position on landform: Toeslopes
Slope: 4 to 8 percent
Elevation: 3,800 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition**Major Components**

Wimper and similar soils: 85 percent

Minor Components

Wimper, greater slope: 0 to 5 percent
 Winspect and similar soils: 0 to 5 percent
 Lap and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Argillite colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

29D—Wimper loam, 8 to 15 percent slopes**Setting**

Landform: Mountains
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent

Elevation: 3,800 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Wimper and similar soils: 85 percent

Minor Components

Wimper, greater slope: 0 to 5 percent
 Winspect and similar soils: 0 to 5 percent
 Lap and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Argillite colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

29E—Wimper gravelly loam, 15 to 35 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent
Elevation: 3,800 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Wimper and similar soils: 85 percent

Minor Components

Wimper, greater slope: 0 to 5 percent
 Winspect and similar soils: 0 to 5 percent
 Lap and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Argillite colluvium

Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.5 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

129D—Wimper-Winspect complex, 8 to 15 percent slopes

Setting

Landform:

- Wimper—Mountains
- Winspect—Mountains

Position on landform:

- Wimper—Footslopes and toeslopes
- Winspect—Footslopes and toeslopes

Slope:

- Wimper—8 to 15 percent
- Winspect—8 to 15 percent

Elevation: 3,800 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Wimper and similar soils: 50 percent
 Winspect and similar soils: 35 percent

Minor Components

Perma and similar soils: 0 to 5 percent
 Lap and similar soils: 0 to 5 percent
 Areas of rock outcrop: 0 to 5 percent

Major Component Description

Wimper

Surface layer texture: Loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Argillite colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.7 inches

Winspect

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 6.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

129E—Wimper-Winspect complex, 15 to 35 percent slopes

Setting

Landform:

- Wimper—Mountains
- Winspect—Mountains

Position on landform:

- Wimper—Backslopes and footslopes
- Winspect—Backslopes and footslopes

Slope:

- Wimper—15 to 35 percent
- Winspect—15 to 35 percent

Elevation: 3,800 to 6,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Wimper and similar soils: 50 percent

Winspect and similar soils: 35 percent

Minor Components

Perma and similar soils: 0 to 5 percent

Lap and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Major Component Description

Wimper

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Argillite colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.6 inches

Winspect

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

129F—Wimper-Winspect complex, 35 to 60 percent slopes

Setting

Landform:

- Wimper—Mountains
- Winspect—Mountains

Position on landform:

- Wimper—Backslopes and shoulders
- Winspect—Backslopes and shoulders

Slope:

- Wimper—35 to 60 percent
- Winspect—35 to 60 percent

Elevation: 3,800 to 6,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Wimper and similar soils: 50 percent

Winspect and similar soils: 35 percent

Minor Components

Perma and similar soils: 0 to 5 percent

Lap and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Major Component Description

Wimper

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Argillite colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.7 inches

Winspect

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone residuum

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 6.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

229E—Wimper-Winspect cobbly loams, 15 to 35 percent slopes

Setting

Landform:

- Wimper—Mountains
- Winspect—Mountains

Position on landform:

- Wimper—Backslopes and footslopes
- Winspect—Backslopes and footslopes

Slope:

- Wimper—15 to 35 percent
- Winspect—15 to 35 percent

Elevation: 3,800 to 6,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Wimper and similar soils: 50 percent

Winspect and similar soils: 35 percent

Minor Components

Lap and similar soils: 0 to 8 percent

Areas of rock outcrop: 0 to 7 percent

Major Component Description

Wimper

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Argillite colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.5 inches

Winspect

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Windham Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderate

Landform: Mountains

Parent material: Colluvium derived from limestone

Slope range: 8 to 60 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, carbonatic, frigid
Typic Calciustolls

Typical Pedon

Windham gravelly loam, 15 to 35 percent slopes, in an area of rangeland, 1,700 feet north and 1,600 feet east of the southwest corner of sec. 11, T. 11 N., R. 14 W.

A—0 to 7 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; strong medium granular structure; soft, very friable, nonsticky, nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; 5 percent cobbles and 25 percent pebbles; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk1—7 to 21 inches; light brownish gray (10YR 6/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky, slightly plastic; many very fine and fine roots; many fine and very fine interstitial pores; 15 percent cobbles and 30 percent pebbles; disseminated lime; few fine masses and seams of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—21 to 32 inches; pale brown (10YR 6/3) very gravelly loam, dark brown (10YR 4/3) moist; weak fine and medium subangular blocky structure;

soft, very friable, nonsticky, nonplastic; common very fine and few fine and medium roots; many fine and very fine discontinuous pores; 15 percent cobbles and 35 percent pebbles; common fine masses and seams of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk3—32 to 60 inches; yellow (10YR 7/6) very gravelly loam, yellowish brown (10YR 5/6) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine and fine roots; common very fine and fine interstitial pores; 15 percent cobbles and 35 percent pebbles; disseminated lime; few fine masses of lime; violently effervescent; strongly alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 16 inches

Depth to the calcic horizon: 7 to 10 inches

A horizon

Hue: 10YR or 7.5YR

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 1 to 3

Clay content: 18 to 27 percent

Content of rock fragments: 15 to 35 percent—0 to 5 percent cobbles; 15 to 30 percent pebbles

Reaction: pH 7.9 to 8.4

Bk horizons

Hue: 7.5YR to 2.5Y

Value: 4 to 8 dry; 3 to 7 moist

Chroma: 2 to 8

Texture: Loam or clay loam

Clay content: 18 to 35 percent

Content of rock fragments: 45 to 70 percent—15 to 20 percent cobbles; 30 to 50 percent pebbles

Calcium carbonate equivalent: 35 to 60 percent

Reaction: pH 7.9 to 8.4

42D—Windham gravelly loam, 8 to 15 percent slopes

Setting

Landform: Mountains

Position on landform: Footslopes and toeslopes

Slope: 8 to 15 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Windham and similar soils: 85 percent

Minor Components

Lap and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Winspect and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

42E—Windham gravelly loam, 15 to 35 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Windham and similar soils: 85 percent

Minor Components

Lap and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Winspect and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

42F—Windham gravelly loam, 35 to 60 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and shoulders

Slope: 35 to 60 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Windham and similar soils: 85 percent

Minor Components

Lap and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Winspect and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.7 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

839D—Windham-Lap-Rock outcrop complex, 8 to 15 percent slopes

Setting

Landform:

- Windham—Mountains
- Lap—Mountains

Position on landform:

- Windham—Foothills and toeslopes
- Lap—Foothills and toeslopes

Slope:

- Windham—8 to 15 percent
- Lap—8 to 15 percent

Elevation: 3,600 to 5,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Windham and similar soils: 45 percent

Lap and similar soils: 30 percent

Rock outcrop: 10 percent

Minor Components

Wimper and similar soils: 0 to 8 percent

Winspect and similar soils: 0 to 7 percent

Major Component Description

Windham

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.7 inches

Lap

Surface layer texture: Loam

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Dominant parent material: Limestone residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

839E—Windham-Lap-Rock outcrop complex, 15 to 35 percent slopes

Setting

Landform:

- Windham—Mountains
- Lap—Mountains
- Rock outcrop—Mountains

Position on landform:

- Windham—Backslopes and footslopes
- Lap—Backslopes and footslopes

Slope:

- Windham—15 to 35 percent
- Lap—15 to 35 percent

Elevation: 3,600 to 5,000 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days**Composition****Major Components**

Windham and similar soils: 45 percent

Lap and similar soils: 30 percent

Rock outcrop: 10 percent

Minor Components

Wimper and similar soils: 0 to 8 percent

Winspect and similar soils: 0 to 7 percent

Major Component Description**Windham***Surface layer texture:* Gravelly loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Limestone colluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 3.7 inches**Lap***Surface layer texture:* Loam*Depth class:* Shallow (10 to 20 inches)*Drainage class:* Well drained*Dominant parent material:* Limestone residuum*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 2.0 inches**Rock outcrop***Definition:* Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

839F—Windham-Lap-Rock outcrop complex, 35 to 60 percent slopes**Setting***Landform:*

- Windham—Mountains
- Lap—Mountains
- Rock outcrop—Mountains

Position on landform:

- Windham—Backslopes and shoulders
- Lap—Backslopes and shoulders

Slope:

- Windham—35 to 60 percent
- Lap—35 to 60 percent

Elevation: 3,600 to 5,000 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days**Composition****Major Components**

Windham and similar soils: 45 percent

Lap and similar soils: 30 percent

Rock outcrop: 10 percent

Minor Components

Wimper and similar soils: 0 to 8 percent

Winspect and similar soils: 0 to 7 percent

Major Component Description**Windham***Surface layer texture:* Gravelly loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Limestone colluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 3.7 inches**Lap***Surface layer texture:* Loam*Depth class:* Shallow (10 to 20 inches)*Drainage class:* Well drained*Dominant parent material:* Limestone residuum*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 2.0 inches**Rock outcrop***Definition:* Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Windlass Series

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Moderate above the 2C horizons, rapid in the 2C horizons

Landform: Alluvial fans, flood plains, and stream terraces

Parent material: Loamy alluvium over sand and gravel

Slope range: 0 to 4 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 12 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 105 days

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Oxyaquic Haplustolls

Typical Pedon

Windlass loam, 0 to 4 percent slopes, rarely flooded, in an area of pasture, 1,400 feet south and 1,200 feet west of the northeast corner of sec. 24, T. 5 N., R. 16 W.

Ap—0 to 10 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, slightly plastic; many very fine and fine roots; common very fine and fine pores; neutral; clear smooth boundary.

Bw—10 to 14 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; common fine and medium and many very fine tubular pores; neutral; clear wavy boundary.

2C1—14 to 19 inches; brown (10YR 5/3) very gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; soft, friable, nonsticky, nonplastic; many very fine and fine roots; common fine and very fine tubular pores; 10 percent cobbles and 25 percent pebbles; neutral; gradual smooth boundary.

2C2—19 to 60 inches; pale brown (10YR 6/3) very gravelly sand, brown (10YR 5/3) moist; few fine distinct brownish yellow (10YR 6/8) and yellowish brown (10YR 5/8) moist redox concentrations; single grain; loose, nonsticky, nonplastic; common very fine and fine roots; 20 percent cobbles and 30 percent pebbles; neutral.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

Depth to the seasonal high water table: 24 to 42 inches

Depth to the sandy-skeletal material: 12 to 20 inches

Ap horizon

Value: 2 or 3 moist

Chroma: 1 or 2

Clay content: 15 to 25 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles

Reaction: pH 6.6 to 7.8

Bw horizon

Value: 3 or 4 moist; 4 to 6 dry

Chroma: 2 or 3

Texture: Loam, sandy loam, or fine sandy loam

Clay content: 15 to 27 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent pebbles

Reaction: pH 6.6 to 7.8

2C1 horizon

Value: 4 or 5 moist; 5 or 6 dry

Chroma: 2 to 4

Texture: Sandy loam, loamy sand, or loam

Clay content: 5 to 18 percent

Content of rock fragments: 35 to 60 percent—10 to 20 percent cobbles; 25 to 40 percent pebbles

Calcium carbonate equivalent: 0 to 3 percent

Reaction: pH 6.6 to 7.8

2C2 horizon

Value: 4 to 6 moist; 5 to 7 dry

Chroma: 2 or 3

Texture: Loamy sand or sand

Clay content: 2 to 10 percent

Content of rock fragments: 40 to 70 percent—15 to 25 percent cobbles; 25 to 45 percent pebbles

Calcium carbonate equivalent: 0 to 3 percent

Reaction: pH 6.6 to 7.8

13B—Windlass-Nirling complex, 0 to 4 percent slopes

Setting

Landform:

- Windlass—Alluvial fans and stream terraces
- Nirling—Alluvial fans and stream terraces

Position on landform:

- Windlass—Treads
- Nirling—Treads

Slope:

- Windlass—0 to 4 percent
- Nirling—0 to 4 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 12 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Windlass and similar soils: 65 percent

Nirling and similar soils: 20 percent

Minor Components

Windlass and similar soils: 0 to 5 percent

Gregson and similar soils: 0 to 5 percent

Cetrack and similar soils: 0 to 5 percent

Major Component Description

Windlass

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Apparent

Available water capacity: Mainly 3.6 inches

Nirling

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Apparent

Available water capacity: Mainly 2.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

113B—Windlass-Nirling complex, 0 to 4 percent slopes, rarely flooded

Setting

Landform:

- Windlass—Flood plains
- Nirling—Flood plains

Position on landform:

- Windlass—Treads
- Nirling—Treads

Slope:

- Windlass—0 to 4 percent
- Nirling—0 to 4 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 12 to 14 inches

Frost-free period: 90 to 105 days

Composition

Major Components

Windlass and similar soils: 65 percent

Nirling and similar soils: 20 percent

Minor Components

Gregson and similar soils: 0 to 5 percent

Bandy and similar soils: 0 to 5 percent

Blossberg and similar soils: 0 to 5 percent

Major Component Description

Windlass

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Apparent

Available water capacity: Mainly 3.6 inches

Nirling

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Apparent

Available water capacity: Mainly 2.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

413B—Windlass loam, 0 to 4 percent slopes, rarely flooded**Setting**

Landform: Flood plains

Position on landform: Treads

Slope: 0 to 4 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition**Major Components**

Windlass and similar soils: 85 percent

Minor Components

Cetrack and similar soils: 0 to 5 percent

Soils with lime below 8 inches: 0 to 5 percent

Bandy and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Apparent

Available water capacity: Mainly 3.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

513B—Windlass-Nirling complex, cool, 0 to 4 percent slopes**Setting**

Landform:

- Windlass—Alluvial fans and stream terraces
- Nirling—Alluvial fans and stream terraces

Position on landform:

- Windlass—Treads
- Nirling—Treads

Slope:

- Windlass—0 to 4 percent
- Nirling—0 to 4 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition**Major Components**

Windlass and similar soils: 65 percent

Nirling and similar soils: 20 percent

Minor Components

Gregson and similar soils: 0 to 4 percent

Bandy and similar soils: 0 to 4 percent

Kleinschmidt and similar soils: 0 to 4 percent

Cetrack and similar soils: 0 to 3 percent

Major Component Description**Windlass**

Surface layer texture: Loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Apparent

Available water capacity: Mainly 3.6 inches

Nirling

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat poorly drained

Dominant parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Apparent

Available water capacity: Mainly 2.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Winkler Series

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Permeability: Moderately rapid

Landform: Mountains

Parent material: Colluvium derived from quartzite

Slope range: 8 to 80 percent

Elevation range: 3,600 to 6,400 feet

Annual precipitation: 18 to 25 inches

Annual air temperature: 38 to 42 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Lamellic Haplustepts

Typical Pedon

Winkler gravelly loam, 35 to 60 percent slopes, in an area of woodland, 1,700 feet south and 3,200 feet east of the northwest corner of sec. 17, T. 7 N., R. 16 W.

Oi—2 inches to 0; undecomposed and slightly decomposed forest litter.

A—0 to 3 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; common fine interstitial pores; 5 percent cobbles and 20 percent pebbles; neutral; clear smooth boundary.

E1—3 to 9 inches; very pale brown (10YR 7/3) gravelly sandy loam, brown (10YR 5/3) moist; weak medium granular structure; soft, very friable, nonsticky, nonplastic; many very fine and fine roots; many fine interstitial pores; 5 percent cobbles and 25 percent pebbles; moderately acid; clear smooth boundary.

E2—9 to 28 inches; pink (7.5YR 8/4) very gravelly sandy loam, light brown (7.5YR 6/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine and fine roots; many fine and very fine interstitial pores; 10 percent cobbles and 35 percent pebbles; moderately acid; gradual wavy boundary.

E and Bt—28 to 43 inches; E part (75 percent) is pinkish white (7.5YR 8/2) extremely gravelly loam, brown (7.5YR 5/4) moist; B part (25 percent) is brown (7.5YR 5/4) fine sandy loam lamellae $\frac{1}{8}$ - to $\frac{1}{4}$ -inch thick, dark brown (7.5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; few fine and very fine roots; common very fine and fine interstitial pores; 20 percent cobbles and 55 percent pebbles; moderately acid; clear smooth boundary.

C—43 to 60 inches; pinkish gray (7.5YR 7/2) extremely gravelly sandy loam, brown (7.5YR 5/2) moist; massive; slightly hard, very friable, nonsticky, nonplastic; few fine roots; few fine pores; 20 percent cobbles and 55 percent pebbles; moderately acid.

Range in Characteristics

Soil temperature: 42 to 47 degrees F

Moisture control section: Between 8 and 24 inches

A horizon

Hue: 10YR or 7.5YR

Value: 3 or 4 moist

Chroma: 2 or 3

Clay content: 7 to 15 percent

Content of rock fragments: 15 to 35 percent—0 to 5 percent cobbles; 15 to 30 percent pebbles

Reaction: pH 6.1 to 7.3

E1 horizon

Hue: 10YR or 7.5YR

Value: 6 to 8 dry; 5 to 7 moist

Chroma: 2 to 4

Clay content: 5 to 15 percent

Content of rock fragments: 15 to 35 percent—0 to 5 percent cobbles; 15 to 30 percent pebbles

Reaction: pH 5.6 to 7.3

E2 horizon

Hue: 2.5Y to 7.5YR

Value: 6 to 8 dry; 5 to 7 moist

Chroma: 2 to 4

Clay content: 5 to 15 percent

Content of rock fragments: 35 to 55 percent—10 to 20 percent cobbles; 25 to 35 percent pebbles

Reaction: pH 5.6 to 7.3

E and Bt horizon

Hue: E part—2.5Y to 7.5YR; B part—2.5Y to 5YR

Value: E part—6 to 8 dry, 5 to 7 moist; B part—4 to 6 dry, 4 or 5 moist

Chroma: E part—2 to 4; B part—3 or 4

Texture: Loam or sandy loam

Clay content: 5 to 15 percent

Content of rock fragments: 60 to 85 percent—10 to 25 percent cobbles; 50 to 60 percent pebbles

Reaction: pH 5.6 to 7.3

C horizon

Hue: 10YR or 7.5YR

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 2 or 3

Clay content: 5 to 15 percent

Content of rock fragments: 60 to 85 percent—10 to 25 percent cobbles; 50 to 60 percent pebbles

Reaction: pH 5.6 to 7.3

86E—Winkler gravelly loam, 15 to 35 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent, southwest aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Winkler and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Whitlash and similar soils: 0 to 5 percent

Yreka and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Quartzite colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

86F—Winkler gravelly loam, 35 to 60 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and shoulders

Slope: 35 to 60 percent, southwest aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Winkler and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent

Yreka and similar soils: 0 to 5 percent

Whitlash and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Quartzite colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

86G—Winkler gravelly loam, 60 to 80 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and shoulders

Slope: 60 to 80 percent, southwest aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Winkler and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 7 percent

Whitlash and similar soils: 0 to 6 percent

Yreka and similar soils: 0 to 2 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Quartzite colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

786D—Winkler gravelly loam, cool, 8 to 15 percent slopes

Setting

Landform: Mountains
Position on landform: Foothills and toeslopes
Slope: 8 to 15 percent, northeast aspect
Elevation: 3,600 to 6,400 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Winkler and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
Yreka and similar soils: 0 to 5 percent
Whitlash and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Quartzite colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

786E—Winkler gravelly loam, cool, 15 to 35 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and foothills

Slope: 15 to 35 percent, northeast aspect
Elevation: 3,600 to 6,400 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Winkler and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
Whitlash and similar soils: 0 to 5 percent
Yreka and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Quartzite colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

786F—Winkler gravelly loam, cool, 35 to 60 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent, northeast aspect
Elevation: 3,600 to 6,400 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Winkler and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
Whitlash and similar soils: 0 to 5 percent
Yreka and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained
Dominant parent material: Quartzite colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

786G—Winkler gravelly loam, cool, 60 to 80 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 60 to 80 percent, northeast aspect
Elevation: 3,600 to 6,400 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Winkler and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 5 percent
 Whitlash and similar soils: 0 to 5 percent
 Yreka and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Quartzite colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.0 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

886E—Winkler-Rubble land-Rock outcrop complex, 15 to 35 percent slopes

Setting

Landform:

- Winkler—Mountains
- Rubble land—Mountains
- Rock outcrop—Mountains

Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent, southwest aspect
Elevation: 3,600 to 6,400 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Winkler and similar soils: 50 percent
 Rubble land: 20 percent
 Rock outcrop: 15 percent

Minor Components

Yreka and similar soils: 0 to 5 percent
 Whitcow and similar soils: 0 to 5 percent
 Whitlash and similar soils: 0 to 5 percent

Major Component Description

Winkler

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Dominant parent material: Quartzite colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.0 inches

Rubble land

Definition: Areas that have more than 90 percent of the surface covered by stones or boulders

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

886F—Winkler-Rubble land-Rock outcrop complex, 35 to 60 percent slopes

Setting

Landform:

- Winkler—Mountains
- Rubble land—Mountains
- Rock outcrop—Mountains

Position on landform: Backslopes and shoulders

Slope: 35 to 60 percent, southwest aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Winkler and similar soils: 50 percent

Rubble land: 20 percent

Rock outcrop: 15 percent

Minor Components

Yreka and similar soils: 0 to 5 percent

Whitlash and similar soils: 0 to 5 percent

Whitecow and similar soils: 0 to 5 percent

Major Component Description

Winkler

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Somewhat excessively drained

Dominant parent material: Quartzite colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.0 inches

Rubble land

Definition: Areas that have more than 90 percent of the surface covered by stones or boulders

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Winspect Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderately slow

Landform: Mountains

Parent material: Colluvium derived from limestone

Slope range: 4 to 70 percent

Elevation range: 3,600 to 6,200 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 44 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Typic Calciustolls

Typical Pedon

Winspect gravelly loam, 15 to 35 percent slopes, in an area of rangeland, 600 feet north and 450 feet east of the southwest corner of sec. 2, T. 7 N., R. 14 W.

A—0 to 6 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure parting to weak fine granular; soft, very friable, slightly sticky, slightly plastic; many fine and very fine and common medium roots; many very fine interstitial pores; 5 percent cobbles and 15 percent pebbles; slightly effervescent; slightly alkaline; clear wavy boundary.

Ak—6 to 11 inches; grayish brown (10YR 5/2) gravelly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many fine and very fine and common medium roots; many very fine interstitial pores; 5 percent cobbles and 25 percent pebbles; disseminated lime; few fine masses of lime; strongly effervescent; slightly alkaline; clear smooth boundary.

Bk1—11 to 20 inches; very pale brown (10YR 7/3) very gravelly loam, light yellowish brown (10YR 6/4) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; common very fine tubular pores; 10 percent cobbles and 30 percent pebbles; disseminated lime; common distinct lime casts on underside of coarse fragments; violently effervescent; strongly alkaline; clear smooth boundary.

Bk2—20 to 28 inches; light yellowish brown (10YR 6/4) very gravelly clay loam, yellowish brown (10YR 5/4) moist; moderate fine subangular blocky structure; slightly hard, friable, moderately sticky, slightly plastic; few very fine roots; few very fine tubular pores; 10 percent cobbles and 30 percent pebbles; disseminated lime; common distinct lime casts on underside of coarse

fragments; violently effervescent; strongly alkaline; gradual wavy boundary.

BC—28 to 60 inches; pale yellow (2.5Y 7/4) very gravelly loam, light yellowish brown (2.5Y 6/4) moist; weak coarse prismatic structure; slightly hard, very friable, slightly sticky, slightly plastic; few very fine roots; common very fine interstitial pores; 10 percent cobbles and 35 percent pebbles; violently effervescent; strongly alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 14 inches

A horizon

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 20 to 25 percent

Content of rock fragments: 15 to 35 percent—5 to 10 percent cobbles; 15 to 25 percent pebbles

Calcium carbonate equivalent: 5 to 10 percent

Reaction: pH 7.4 to 8.4

Ak horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Texture: Loam or clay loam

Clay content: 20 to 30 percent

Content of rock fragments: 20 to 35 percent—5 to 10 percent cobbles; 15 to 25 percent pebbles

Calcium carbonate equivalent: 10 to 40 percent

Reaction: pH 7.4 to 8.4

Bk horizons

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 20 to 35 percent

Content of rock fragments: 35 to 50 percent—10 to 20 percent cobbles; 25 to 30 percent pebbles

Calcium carbonate equivalent: 15 to 40 percent

Reaction: pH 7.9 to 9.0

BC horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 20 to 35 percent

Content of rock fragments: 40 to 55 percent—10 to 20 percent cobbles; 30 to 35 percent pebbles

Calcium carbonate equivalent: 15 to 40 percent

Reaction: pH 7.9 to 9.0

39C—Winspect gravelly loam, 4 to 8 percent slopes

Setting

Landform: Mountains

Position on landform: Toeslopes

Slope: 4 to 8 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Winspect and similar soils: 85 percent

Minor Components

Shawmut and similar soils: 0 to 5 percent

Wimper and similar soils: 0 to 4 percent

Areas of rock outcrop: 0 to 3 percent

Judell and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

39D—Winspect gravelly loam, 8 to 15 percent slopes

Setting

Landform: Mountains

Position on landform: Footslopes and toeslopes

Slope: 8 to 15 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Winspect and similar soils: 85 percent

Minor Components

Shawmut and similar soils: 0 to 5 percent

Wimper and similar soils: 0 to 4 percent

Areas of rock outcrop: 0 to 3 percent

Judell and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

39E—Winspect gravelly loam, 15 to 35 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Winspect and similar soils: 85 percent

Minor Components

Shawmut and similar soils: 0 to 5 percent

Wimper and similar soils: 0 to 4 percent

Areas of rock outcrop: 0 to 3 percent

Judell and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

39F—Winspect gravelly loam, 35 to 60 percent slopes

Setting

Landform: Mountains

Position on landform: Backslopes and shoulders

Slope: 35 to 60 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Winspect and similar soils: 85 percent

Minor Components

Shawmut and similar soils: 0 to 5 percent

Wimper and similar soils: 0 to 4 percent

Areas of rock outcrop: 0 to 3 percent

Judell and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

**139E—Winspect-Lap gravelly loams,
15 to 35 percent slopes****Setting***Landform:*

- Winspect—Mountains
- Lap—Mountains

Position on landform:

- Winspect—Backslopes and footslopes
- Lap—Backslopes and footslopes

Slope:

- Winspect—15 to 35 percent
- Lap—15 to 35 percent

Elevation: 3,600 to 6,000 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days**Composition****Major Components**

Winspect and similar soils: 55 percent

Lap and similar soils: 30 percent

Minor Components

Wimper and similar soils: 0 to 5 percent

Windham and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Major Component Description**Winspect***Surface layer texture:* Gravelly loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Limestone colluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 6.1 inches**Lap***Surface layer texture:* Gravelly loam*Depth class:* Shallow (10 to 20 inches)*Drainage class:* Well drained*Dominant parent material:* Limestone residuum*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 1.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

**139F—Winspect-Lap gravelly loams,
35 to 60 percent slopes****Setting***Landform:*

- Winspect—Mountains
- Lap—Mountains

Position on landform:

- Winspect—Backslopes and shoulders
- Lap—Backslopes and shoulders

Slope:

- Winspect—35 to 60 percent
- Lap—35 to 60 percent

Elevation: 3,600 to 6,000 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days**Composition****Major Components**

Winspect and similar soils: 55 percent

Lap and similar soils: 30 percent

Minor Components

Wimper and similar soils: 0 to 5 percent

Windham and similar soils: 0 to 5 percent

Areas of rock outcrop: 0 to 5 percent

Major Component Description**Winspect***Surface layer texture:* Gravelly loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Limestone residuum*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 6.1 inches**Lap***Surface layer texture:* Gravelly loam*Depth class:* Shallow (10 to 20 inches)*Drainage class:* Well drained*Dominant parent material:* Limestone residuum*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 1.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

239C—Winspect cobbly loam, 4 to 8 percent slopes

Setting

Landform: Mountains

Position on landform: Toeslopes

Slope: 4 to 8 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Winspect and similar soils: 85 percent

Minor Components

Judell and similar soils: 0 to 5 percent

Shawmut and similar soils: 0 to 5 percent

Wimper and similar soils: 0 to 3 percent

Areas of rock outcrop: 0 to 2 percent

Major Component Description

Surface layer texture: Cobbly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

439E—Winspect-Rock outcrop complex, 15 to 35 percent slopes

Setting

Landform:

- Winspect—Mountains

- Rock outcrop—Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Winspect and similar soils: 55 percent

Rock outcrop: 30 percent

Minor Components

Shawmut and similar soils: 0 to 5 percent

Wimper and similar soils: 0 to 5 percent

Lap and similar soils: 0 to 5 percent

Major Component Description

Winspect

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Limestone residuum

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.1 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

439F—Winspect-Rock outcrop complex, 35 to 60 percent slopes

Setting

Landform:

- Winspect—Mountains

- Rock outcrop—Mountains

Position on landform: Backslopes and shoulders

Slope: 35 to 60 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Winspect and similar soils: 55 percent

Rock outcrop: 30 percent

Minor Components

Shawmut and similar soils: 0 to 5 percent

Wimper and similar soils: 0 to 5 percent

Lap and similar soils: 0 to 5 percent

Major Component Description

Winspect

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.1 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

439G—Winspect-Rock outcrop complex, 60 to 80 percent slopes

Setting

Landform:

- Winspect—Mountains
- Rock outcrop—Mountains

Position on landform: Backslopes and shoulders

Slope: 60 to 70 percent

Elevation: 3,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Winspect and similar soils: 55 percent
 Rock outcrop: 30 percent

Minor Components

Lap and similar soils: 0 to 8 percent
 Wimper and similar soils: 0 to 7 percent

Major Component Description

Winspect

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Limestone residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.1 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Worock Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderately slow

Landform: Mountains

Parent material: Material weathered from igneous rock

Slope range: 8 to 60 percent

Elevation range: 4,600 to 7,500 feet

Annual precipitation: 20 to 30 inches

Annual air temperature: 35 to 38 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Eutric Haplocryalfs

Typical Pedon

Worock gravelly loam, cool, 8 to 15 percent slopes, in an area of woodland, 1,300 feet north and 1,600 feet west of the southeast corner of sec. 30, T. 5 N., R. 14 W.

E—0 to 6 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; weak fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine and common medium roots; many very fine irregular pores; 5 percent cobbles and 15 percent pebbles; slightly acid; clear smooth boundary.

E/Bt—6 to 17 inches; E part (85 percent) is light brown (7.5YR 6/4) gravelly loam, brown (7.5YR 5/4) moist; B part (15 percent) is brown (7.5YR 5/4) gravelly clay loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common medium and coarse roots; many very fine and fine and common medium tubular random pores; few faint clay films on faces of peds; 10 percent cobbles and 20 percent pebbles; slightly acid; clear smooth boundary.

Bt—17 to 34 inches; very pale brown (10YR 7/4) very gravelly clay loam, yellowish brown (10YR 5/6) moist; moderate medium subangular blocky structure; hard, firm, moderately sticky, moderately plastic; many very fine and fine and common medium and coarse roots; many very fine and common fine tubular random pores; few faint clay films on faces of peds; 10 percent cobbles and 30 percent pebbles; slightly acid; clear smooth boundary.

C—34 to 60 inches; light yellowish brown (10YR 6/4) very gravelly sandy clay loam, brownish yellow (10YR 6/6) moist; massive; hard, firm, moderately sticky, moderately plastic; common fine and medium roots; many very fine and common fine tubular random pores; 10 percent cobbles and 30 percent pebbles; slightly acid.

Range in Characteristics

Soil temperature: 37 to 45 degrees F

Moisture control section: Between 4 and 12 inches

E horizon

Value: 6 or 7 dry; 3 to 5 moist

Chroma: 2 to 4

Clay content: 15 to 25 percent

Content of rock fragments: 15 to 35 percent—0 to 5 percent cobbles; 15 to 30 percent pebbles

Reaction: pH 5.1 to 6.5

E/Bt horizon

Hue: 10YR or 7.5YR

Value: E part—6 or 7 dry, 3 to 5 moist; B part—5 or 6 dry, 4 or 5 moist

Chroma: E part—2 to 6; B part—4 or 6

Texture: Loam, sandy loam, clay loam, or sandy clay loam

Clay content: 18 to 30 percent

Content of rock fragments: 20 to 35 percent—10 to 15 percent cobbles; 10 to 20 percent pebbles

Reaction: pH 5.1 to 6.5

Bt horizon

Hue: 10YR or 7.5YR

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 4 or 6

Texture: Sandy clay loam or clay loam

Clay content: 25 to 35 percent

Content of rock fragments: 35 to 60 percent—0 to 5 percent stones; 10 to 15 percent cobbles; 30 to 40 percent pebbles

Reaction: pH 5.6 to 6.5

C horizon

Hue: 10YR or 7.5YR

Value: 6 or 7 dry; 4 to 6 moist

Chroma: 3, 4, or 6

Texture: Sandy clay loam, loam, or clay loam

Clay content: 18 to 30 percent

Content of rock fragments: 35 to 60 percent—0 to 5 percent stones; 10 to 15 percent cobbles; 25 to 35 percent pebbles

Reaction: pH 5.6 to 6.5

96D—Worock gravelly loam, cool, 8 to 15 percent slopes

Setting

Landform: Mountains

Position on landform: Foothills and toeslopes

Slope: 8 to 15 percent

Elevation: 5,800 to 7,500 feet

Mean annual precipitation: 24 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Worock and similar soils: 85 percent

Minor Components

Loberg and similar soils: 0 to 4 percent

Elve and similar soils: 0 to 5 percent

Evano and similar soils: 0 to 3 percent

Danaher and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

96E—Worock gravelly loam, cool, 15 to 35 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent
Elevation: 5,800 to 7,500 feet
Mean annual precipitation: 24 to 30 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Worock and similar soils: 85 percent

Minor Components

Elve and similar soils: 0 to 5 percent
 Loberg and similar soils: 0 to 4 percent
 Evaro and similar soils: 0 to 3 percent
 Danaher and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

96F—Worock gravelly loam, cool, 35 to 60 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent
Elevation: 5,800 to 7,500 feet
Mean annual precipitation: 24 to 30 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Worock and similar soils: 85 percent

Minor Components

Elve and similar soils: 0 to 5 percent
 Evaro and similar soils: 0 to 4 percent
 Loberg and similar soils: 0 to 3 percent
 Danaher and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

196E—Worock-Loberg, moist complex, 15 to 35 percent slopes

Setting

Landform:

- Worock—Mountains
- Loberg—Mountains

Position on landform:

- Worock—Backslopes and footslopes
- Loberg—Backslopes and footslopes

Slope:

- Worock—15 to 35 percent
- Loberg—15 to 35 percent

Elevation: 5,800 to 7,500 feet
Mean annual precipitation: 24 to 30 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Worock and similar soils: 50 percent
 Loberg and similar soils: 35 percent

Minor Components

Danaher and similar soils: 0 to 5 percent

Ovando and similar soils: 0 to 5 percent

Elkner and similar soils: 0 to 5 percent

Major Component Description**Worock**

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

Loberg

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

**396E—Worock gravelly loam,
15 to 35 percent slopes****Setting**

Landform: Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent

Elevation: 5,800 to 7,500 feet

Mean annual precipitation: 24 to 30 inches

Frost-free period: 30 to 70 days

Composition**Major Components**

Worock and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 3 percent

Danaher and similar soils: 0 to 3 percent

Loberg and similar soils: 0 to 3 percent

Elve and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.6 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

**596D—Worock-Loberg complex,
8 to 15 percent slopes****Setting**

Landform:

- Worock—Mountains
- Loberg—Mountains

Position on landform:

- Worock—Footslopes and toeslopes
- Loberg—Footslopes and toeslopes

Slope:

- Worock—8 to 15 percent
- Loberg—8 to 15 percent

Elevation: 5,800 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition**Major Components**

Worock and similar soils: 50 percent

Loberg and similar soils: 35 percent

Minor Components

Elve and similar soils: 0 to 5 percent

Foolhen and similar soils: 0 to 5 percent

Danaher and similar soils: 0 to 5 percent

Major Component Description**Worock**

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

Loberg

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

596E—Worock-Loberg complex, 15 to 35 percent slopes

Setting

Landform:

- Worock—Mountains
- Loberg—Mountains

Position on landform:

- Worock—Backslopes and footslopes
- Loberg—Backslopes and footslopes

Slope:

- Worock—15 to 35 percent
- Loberg—15 to 35 percent

Elevation: 5,800 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Worock and similar soils: 50 percent

Loberg and similar soils: 35 percent

Minor Components

Elve and similar soils: 0 to 3 percent

Foolhen and similar soils: 0 to 3 percent

Areas of rock outcrop: 0 to 3 percent

Danaher and similar soils: 0 to 3 percent

Major Component Description

Worock

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

Loberg

Surface layer texture: Clay loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from extrusive igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

596F—Worock-Loberg gravelly loams, 35 to 60 percent slopes

Setting

Landform:

- Worock—Mountains
- Loberg—Mountains

Position on landform:

- Worock—Backslopes and shoulders
- Loberg—Backslopes and shoulders

Slope:

- Worock—35 to 60 percent
- Loberg—35 to 60 percent

Elevation: 5,800 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Composition

Major Components

Worock and similar soils: 50 percent

Loberg and similar soils: 35 percent

Minor Components

Areas of rock outcrop: 0 to 4 percent

Worock and similar soils: 0 to 4 percent

Elve and similar soils: 0 to 4 percent

Foolhen and similar soils: 0 to 3 percent

Major Component Description

Worock

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.3 inches

Loberg

Surface layer texture: Clay loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from extrusive igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.1 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

696E—Worock gravelly loam, dry, 15 to 35 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent
Elevation: 5,800 to 7,500 feet
Mean annual precipitation: 24 to 30 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Worock and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 4 percent
 Loberg and similar soils: 0 to 4 percent
 Evaro and similar soils: 0 to 4 percent
 Danaher and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

696F—Worock gravelly loam, dry, 35 to 60 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent
Elevation: 5,800 to 7,500 feet
Mean annual precipitation: 24 to 30 inches
Frost-free period: 30 to 70 days

Composition

Major Components

Worock and similar soils: 85 percent

Minor Components

Areas of rock outcrop: 0 to 4 percent
 Loberg and similar soils: 0 to 4 percent
 Evaro and similar soils: 0 to 4 percent
 Danaher and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

996E—Worock, cool-Rock outcrop complex, 15 to 35 percent slopes**Setting***Landform:*

- Worock—Mountains
- Rock outcrop—Mountains

Position on landform:

- Worock—Backslopes and footslopes
- Rock outcrop—Backslopes and footslopes

Slope: 15 to 35 percent*Elevation:* 5,800 to 7,500 feet*Mean annual precipitation:* 24 to 30 inches*Frost-free period:* 30 to 70 days**Composition****Major Components**

Worock and similar soils: 50 percent

Rock outcrop: 35 percent

Minor Components

Danaher and similar soils: 0 to 4 percent

Elve and similar soils: 0 to 4 percent

Evaro and similar soils: 0 to 4 percent

Loberg and similar soils: 0 to 3 percent

Major Component Description**Worock***Surface layer texture:* Gravelly loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from igneous rocks*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 5.6 inches**Rock outcrop***Definition:* Areas of exposed igneous bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

996F—Worock-Rock outcrop complex, 35 to 60 percent slopes**Setting***Landform:*

- Worock—Mountains
- Rock outcrop—Mountains

Position on landform: Backslopes and shoulders*Slope:* 35 to 60 percent*Elevation:* 5,800 to 7,500 feet*Mean annual precipitation:* 24 to 30 inches*Frost-free period:* 30 to 70 days**Composition****Major Components**

Worock and similar soils: 50 percent

Rock outcrop: 35 percent

Minor Components

Elve and similar soils: 0 to 4 percent

Evaro and similar soils: 0 to 4 percent

Loberg and similar soils: 0 to 4 percent

Rubble land: 0 to 3 percent

Major Component Description**Worock***Surface layer texture:* Gravelly loam*Depth class:* Very deep (more than 60 inches)*Drainage class:* Well drained*Dominant parent material:* Material weathered from igneous rocks*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 5.3 inches**Rock outcrop***Definition:* Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

Yreka Series

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Permeability: Moderately slow

Landform: Mountains

Parent material: Material weathered from igneous rock

Slope range: 4 to 60 percent

Elevation range: 3,600 to 6,400 feet

Annual precipitation: 18 to 26 inches

Annual air temperature: 38 to 42 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Typic Haplustalfs

Typical Pedon

Yreka gravelly loam, in an area of Bignell-Yreka gravelly loams, 35 to 60 percent slopes, in an area of woodland, 100 feet south and 2,300 feet east of the northwest corner of sec. 17, T. 9 N., R. 14 W.

Oi—2 inches to 0; undecomposed and partially decomposed twigs and needles.

E1—0 to 3 inches; light brownish gray (10YR 6/2) gravelly loam, dark grayish brown (10YR 4/2) moist; weak thin platy structure; soft, very friable, slightly sticky, slightly plastic; many fine and very fine roots; many very fine interstitial pores; 5 percent cobbles and 20 percent pebbles; neutral; clear wavy boundary.

E2—3 to 9 inches; pinkish gray (7.5YR 6/2) very gravelly loam, brown (7.5YR 5/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and very fine roots; many very fine interstitial pores; 10 percent cobbles and 30 percent pebbles; neutral; gradual wavy boundary.

E/Bt—9 to 17 inches; E part (80 percent) is pinkish gray (5YR 6/2) very gravelly clay loam, reddish brown (5YR 5/3) moist; B part (20 percent) is light reddish brown (5YR 6/3) very gravelly clay loam, reddish brown (5YR 4/4) moist; weak fine subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; many very fine and fine roots; common very fine interstitial pores; 10 percent cobbles and 30 percent pebbles; neutral; gradual wavy boundary.

Bt1—17 to 32 inches; light reddish brown (5YR 6/3) very gravelly sandy clay loam, reddish brown (5YR 4/4) moist; moderate fine subangular blocky structure; hard, firm, slightly sticky, slightly plastic; common fine and very fine and few coarse roots; common very fine interstitial pores; common faint

clay films on faces of peds; 10 percent cobbles and 40 percent pebbles; slightly acid; gradual wavy boundary.

Bt2—32 to 60 inches; light brown (7.5YR 6/4) very cobbly clay loam, brown (7.5YR 5/4) moist; moderate fine subangular blocky structure; hard, firm, moderately sticky, moderately plastic; few very fine roots; few very fine interstitial pores; common distinct clay films on faces of peds; 20 percent cobbles and 35 percent pebbles; slightly acid.

Range in Characteristics

Soil temperature: 40 to 44 degrees F

Moisture control section: Between 4 and 12 inches

E horizons

Hue: 10YR or 7.5YR

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 2 or 3

Clay content: 7 to 20 percent

Content of rock fragments: 15 to 35 percent—5 to 10 percent cobbles and stones; 10 to 25 percent pebbles

Reaction: pH 5.6 to 7.3

E/Bt horizon

Hue: 10YR or 7.5YR

Value: E part—6 or 7 dry, 5 or 6 moist; B part—5 or 6 dry, 4 or 5 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 10 to 25 percent (mixed)

Content of rock fragments: 20 to 40 percent—0 to 10 percent cobbles; 20 to 30 percent pebbles

Reaction: pH 5.6 to 7.3

Bt horizons

Hue: 10YR or 7.5YR

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 to 4

Texture: Clay loam or sandy clay loam

Clay content: 20 to 35 percent

Content of rock fragments: 35 to 60 percent—10 to 20 percent cobbles; 25 to 40 percent pebbles

Reaction: pH 5.6 to 7.3

95D—Yreka gravelly loam, 8 to 15 percent slopes

Setting

Landform: Mountains

Position on landform: Footslopes and toeslopes

Slope: 8 to 15 percent, southwest aspect
Elevation: 3,600 to 6,400 feet
Mean annual precipitation: 20 to 25 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Yreka and similar soils: 85 percent

Minor Components

Bignell and similar soils: 0 to 5 percent
 Winkler and similar soils: 0 to 4 percent
 Whitlash and similar soils: 0 to 3 percent
 Crow and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

95E—Yreka gravelly loam, 15 to 35 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent, southwest aspect
Elevation: 3,600 to 6,400 feet
Mean annual precipitation: 20 to 25 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Yreka and similar soils: 85 percent

Minor Components

Bignell and similar soils: 0 to 5 percent
 Winkler and similar soils: 0 to 4 percent
 Whitlash and similar soils: 0 to 3 percent
 Crow and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

95F—Yreka gravelly loam, 35 to 60 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent, southwest aspect
Elevation: 3,600 to 6,400 feet
Mean annual precipitation: 20 to 25 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Yreka and similar soils: 85 percent

Minor Components

Bignell and similar soils: 0 to 5 percent
 Winkler and similar soils: 0 to 4 percent
 Whitlash and similar soils: 0 to 3 percent
 Crow and similar soils: 0 to 3 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

195D—Yreka gravelly loam, cool, 8 to 15 percent slopes

Setting

Landform: Mountains
Position on landform: Footslopes and toeslopes
Slope: 8 to 15 percent
Elevation: 3,600 to 6,400 feet
Mean annual precipitation: 20 to 25 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Yreka and similar soils: 85 percent

Minor Components

Crow and similar soils: 0 to 5 percent
Bignell and similar soils: 0 to 5 percent
Winkler and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

195E—Yreka gravelly loam, cool, 15 to 35 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and footslopes
Slope: 15 to 35 percent, northeast aspect
Elevation: 3,600 to 6,400 feet
Mean annual precipitation: 20 to 25 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Yreka and similar soils: 85 percent

Minor Components

Crow and similar soils: 0 to 5 percent
Bignell and similar soils: 0 to 5 percent
Winkler and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

195F—Yreka gravelly loam, cool, 35 to 60 percent slopes

Setting

Landform: Mountains
Position on landform: Backslopes and shoulders
Slope: 35 to 60 percent, northeast aspect
Elevation: 3,600 to 6,400 feet
Mean annual precipitation: 20 to 25 inches
Frost-free period: 70 to 90 days

Composition

Major Components

Yreka and similar soils: 85 percent

Minor Components

Crow and similar soils: 0 to 5 percent
Bignell and similar soils: 0 to 5 percent
Winkler and similar soils: 0 to 5 percent

Major Component Description

Surface layer texture: Gravelly loam
Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Dominant parent material: Material weathered from igneous rocks
Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

995E—Yreka-Rock outcrop complex, 15 to 35 percent slopes

Setting

Landform:

- Yreka—Mountains
- Rock outcrop—Mountains

Position on landform: Backslopes and footslopes

Slope: 15 to 35 percent, southwest aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 20 to 25 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Yreka and similar soils: 55 percent

Rock outcrop: 30 percent

Minor Components

Winkler and similar soils: 0 to 4 percent

Whitecow and similar soils: 0 to 4 percent

Mocmont and similar soils: 0 to 4 percent

Bignell and similar soils: 0 to 3 percent

Major Component Description

Yreka

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

995F—Yreka-Rock outcrop complex, 35 to 60 percent slopes

Setting

Landform:

- Yreka—Mountains
- Rock outcrop—Mountains

Position on landform: Backslopes and shoulders

Slope: 35 to 60 percent, southwest aspect

Elevation: 3,600 to 6,400 feet

Mean annual precipitation: 20 to 25 inches

Frost-free period: 70 to 90 days

Composition

Major Components

Yreka and similar soils: 55 percent

Rock outcrop: 30 percent

Minor Components

Winkler and similar soils: 0 to 4 percent

Whitecow and similar soils: 0 to 4 percent

Mocmont and similar soils: 0 to 4 percent

Bignell and similar soils: 0 to 3 percent

Major Component Description

Yreka

Surface layer texture: Gravelly loam

Depth class: Very deep (more than 60 inches)

Drainage class: Well drained

Dominant parent material: Material weathered from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

Rock outcrop

Definition: Areas of exposed bedrock

A typical soil description with range in characteristics is included, in alphabetical order, in this section.

Management

For management information about this map unit, see appropriate sections in Part II of this publication.

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Glossary

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 areal 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 redox 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 redox features.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

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 cobbles or gravel. 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 with .01 to 0.1 percent of the surface covered with boulders.

Bouldery soil material. Soil that is 15 to 35 percent, by volume, rock fragments that are dominated by fragments 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 reduce or eliminate competition from woody vegetation and thus to allow understory grasses and forbs to recover or to make conditions favorable for reseeding. 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. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches 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 erosive activity of a mountain glacier.
- Clay.** As a soil separate, the mineral soil particles less than 0.002 millimeters 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.
- Clayey soil.** Silty clay, sandy clay, or clay.
- 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 mean annual increment.
- Complex slope.** Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.
- Complex, soil.** A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.
- Concretions.** Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.
- 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.** Any tillage and planting system in which a cover of crop residue is maintained on at least 30 percent of the soil surface after planting in order to reduce the hazard of water erosion. In areas where soil blowing is the primary concern, a system that maintains a cover of at least 1,000 pounds of flat residue of small grain or the equivalent during the critical erosion period.
- 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" (Soil Survey Division Staff, 1993).

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 (or contour farming). 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.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deep soil. A soil that is 40 to 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

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.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

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

Excessively drained.—These soils have very high and high hydraulic conductivity and a low water-holding capacity. They are not suited to crop production unless irrigated.

Somewhat excessively drained.—These soils have high hydraulic conductivity and a low water-holding capacity. Without irrigation, only a narrow range of crops can be grown, and yields are low.

Well drained.—These soils have an intermediate water-holding capacity. They retain optimum amounts of moisture, but they are not wet close enough to the surface or long enough during the growing season to adversely affect yields.

Moderately well drained.—These soils are wet close enough to the surface or long enough that planting or harvesting operations or yields of some field crops are adversely affected unless a drainage system is installed. Moderately well-drained soils commonly have a layer with low hydraulic conductivity, a wet layer relatively high in the profile, additions of water by seepage, or some combination of these.

Somewhat poorly drained.—These soils are wet close enough to the surface or long enough that planting or harvesting operations or crop growth is markedly restricted unless a drainage system is installed. Somewhat poorly drained soils commonly have a layer with low hydraulic conductivity, a wet layer high in the profile, additions of water through seepage, or a combination of these.

Poorly drained.—These soils commonly are so wet, at or near the surface, during a considerable part of the year that field crops cannot be grown under natural conditions. Poorly drained conditions are caused by a saturated zone, a layer with low hydraulic conductivity, seepage, or a combination of these.

Very poorly drained.—These soils are wet to the surface most of the time. The wetness prevents the growth of important crops (except rice) unless a drainage system is installed.

Drainage, surface. Runoff, or surface flow of water, from an area.

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 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.
- Excess fines (in tables).** Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.
- Excess salt (in tables).** Excess water-soluble salts in the soil that restrict the growth of most plants.
- 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.** 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. The surface profile is dominantly concave. In terms of gradational processes, a footslope is a transitional zone between an upslope site of erosion (backslope) and a downslope site of deposition (toeslope).
- 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.
- Frost action (in tables).** Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.
- 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 draining 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.** Soil that is 15 to 35 percent, by volume, rounded or angular rock fragments up to 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 by volume.
- 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.
- 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.
- 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 8 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" (Soil Survey Division Staff, 1993). 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 or E 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.—Sedimentary beds of consolidated sandstone and semiconsolidated and consolidated shale. Generally, roots can penetrate this horizon only along fracture planes.

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-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

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.

Increasesers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasesers 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

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.

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.

K_{sat} . Saturated hydraulic conductivity. (See Permeability.)

Kame. A moundlike hill of glacial drift, composed chiefly of stratified sand and gravel.

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.

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 redox 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.

Miscellaneous water. A sewage lagoon, an industrial waste pit, a fish hatchery, or a similar water area.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately deep soil. A soil that is 20 to 40 inches deep over bedrock or to other material that restricts the penetration of plant roots.

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 glacial drift in a topographic landform of its own, resulting chiefly from the direct action of glacial ice. Some types are lateral, recessional, and terminal.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Areas of color that differ from the matrix color. These colors are commonly attributes retained from the geologic parent material. (See Redox features for indications of poor aeration and impeded drainage.)

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.

Naturalized pasture. Forestland that is used primarily for the production of forage for grazing by livestock rather than for the production of wood products. Overstory trees are removed or managed to promote the native and introduced understory vegetation occurring on the site. This vegetation is managed for its forage value through the use of grazing management principles.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

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.

Observed rooting depth. Depth to which roots have been observed to penetrate.

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. An extensive area of glaciofluvial material that was deposited by meltwater streams.

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.

Percolates slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water or air to move downward through the profile.

Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 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.

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

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.

Poor filter (in tables). Because of rapid permeability or an impermeable layer near the surface, the soil may not adequately filter effluent from a waste disposal system.

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 interferences by man 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. The application of fire to land under such conditions of weather, soil moisture, and time of day as presumably will result in the intensity of heat and spread required to accomplish specific forest management, wildlife, grazing, or fire hazard reduction purposes.

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. 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.

Redox 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.

Redox features. Redox concentrations, redox 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 redox 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.

Riverwash. Unstable areas of sandy, silty, clayey, or gravelly sediments. These areas are flooded, washed, and reworked by rivers so frequently that they support little or no vegetation.

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, boulders, stones, cobbles, and gravel.

Rock outcrop. Exposures of bare bedrock other than lava flows and rock-lined pits.

Root zone. The part of the soil that can be penetrated by plant roots.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Rubble land. Areas that have more than 90 percent of the surface covered by stones or boulders. Voids contain no soil material and virtually no vegetation other than lichens. The areas commonly are at the base of mountain slopes, but some are on mountain slopes as deposits of cobbles, stones, and boulders left by Pleistocene glaciation or by periglacial phenomena.

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 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.

Seepage (in tables). The movement of water through soil. Seepage adversely affects the specified use.

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 or of the underlying material. 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.

Shallow soil. A soil that is 10 to 20 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shelterwood system. A forest management system requiring the removal of a stand in a series of cuts so that regeneration occurs under a partial canopy. After regeneration, a final cut removes the shelterwood and allows the stand to develop in the open as an even-aged stand. The system is well suited to sites where shelter is needed for regeneration, and it can aid regeneration of the more intolerant tree species in a stand.

Shoulder. The uppermost inclined surface at the top of a hillside. It is the transitional zone from the backslope to the summit of a hill or mountain. 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 millimeters) to the lower limit of very fine sand (0.05 millimeters). 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. A similarity index is 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 class. A grouping of site indexes into five to seven production capability levels. Each level can be represented by a site curve.

Site curve (50-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for the range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 50 years old or are 50 years old at breast height.

Site curve (100-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 100 years old or are 100 years old at breast height.

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 or 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 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.

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.

Slickspot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil generally is loamy or clayey, is slippery when wet, and is low in productivity.

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 specific use.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to $\text{Ca}^{++} + \text{Mg}^{++}$. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Sodium adsorption ratio (SAR). A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from

saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Species. A single, distinct kind of plant or animal having certain distinguishing characteristics.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

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 tillage, or stones cover .01 to 0.1 percent of the surface. Very stony means that 0.1 to 3.0 percent of the surface is covered with stones. Extremely stony means that 3 to 15 percent of the surface is covered with stones.

Stony soil material. Soil that is 15 to 35 percent, by volume, rock fragments that are dominated by fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Strath terrace. A surface cut formed by the erosion of hard or semiconsolidated bedrock and thinly mantled with stream deposits.

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.

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel. It originally formed near the level of the stream and is the dissected remnants of an abandoned flood plain, streambed, or valley floor that were produced during a former stage of erosion or deposition.

Strippcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to soil blowing 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 or loosen a layer that is restrictive to roots.

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. A general term for the top, or highest level, of an upland feature, such as a hill or mountain. It commonly refers to a higher area that has a gentle slope and is flanked by steeper slopes.

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 of a structure.

Talus. Rock fragments of any size or shape, commonly coarse and angular, derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose, broken rock formed chiefly by falling, rolling, or sliding.

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.

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. Small, irregular step-like forms 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 such as sheep or cattle.

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.”

Thin layer (in tables). A layer of otherwise suitable soil material that is too thin for the specified use.

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 outermost inclined surface at the base of a hill. Toeslopes are commonly gentle and linear in profile.

Too arid (in tables). The soil is dry most of the time, and vegetation is difficult to establish.

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.

Very deep soil. A soil that is more than 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Very shallow soil. A soil that is less than 10 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a

sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Water-spreading. Diverting runoff from natural channels by means of a system of dams, dikes, or ditches and spreading it over relatively flat surfaces.

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 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 action of uprooting and tipping over trees by the wind.

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