United States Department of Agriculture

NRCS

Natural Resources Conservation Service

In cooperation with United States Department of Agriculture, Forest Service, and Washington State University

Soil Survey of Okanogan National Forest Area, Washington

AUTHENTICATED U.S. GOVERNMENT INFORMATION GPO

Where To Get More Information

More information about soils is available from the Web site of the Soils Division of the Natural Resources Conservation Service (http://soils.usda.gov). This site includes links to other sites where additional information specific to the soils in the survey area can be accessed, including the Soil Data Mart (http://soildatamart.nrcs.usda.gov) and the Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app).

National Cooperative Soil Survey

This document 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. This document was made cooperatively by the Natural Resources Conservation Service, the USDA Forest Service, and Washington State University. The survey is part of the technical assistance furnished to the Okanogan National Forest Area, Washington.

Major fieldwork for this soil survey was completed in 2005. Soil names and descriptions were approved in 2005. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2005. The most current official data are available on the Internet.

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Cover Caption

View looking northwest towards Sunrise Peak from Sweetgrass Butte across the Goat Creek Valley.

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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Preface

While a soil survey is in progress, information that affects land use planning is gathered. The information from the survey can be used to make predictions about soil behavior for selected land uses. The information highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment. The information gathered for this soil survey is distributed by several methods, including the Web Soil Survey, the Soil Data Mart, the electronic Field Office Technical Guide, and this publication.

Soil survey reports have traditionally contained tables providing the properties of the soils and interpretations regarding the use of the soils. The tables for this survey area are available online from the Web Soil Survey at http://websoilsurvey.nrcs.usda.gov/app/.

This publication is intended to supplement the official soil survey information that is available on the Web Soil Survey. This publication includes climate tables, taxonomic unit descriptions, detailed map unit descriptions, a description of how the survey was made, and a description of the formation of the soils. See the Contents for additional information available in this publication.

Soil surveys provide information for many different users. Farmers, ranchers, foresters, and agronomists can use the information 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 surveys 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 surveys 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 publication is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this publication 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 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.

Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Soil Survey of
Okanogan National Forest Area, Washington

By Keith Harrington and Brad Duncan, Natural Resources Conservation Service

Nonwilderness areas mapped by Brad Duncan, Ron Raney, Doug Gehring, Keith Harrington, and Rebecca Morris, Natural Resources Conservation Service

Lake Chelan Sawtooth Wilderness Area and Pasayten Wilderness Area mapped by Toby Rodgers, Natural Resources Conservation Service

Forestry fieldwork and assistance provided by Gloria Quintal, USDA Forest Service, and Dennis Robinson, Natural Resources Conservation Service

This survey was conducted under a memorandum of understanding between the USDA Forest Service, the Natural Resources Conservation Service, and Washington State University. The Forest Service provided funding, oversight, coordination, and vegetation correlation. The oversight and coordination were provided by Ken Radek, forest soil scientist, and the vegetation correlation was provided by Gloria Quintal, forest technician. The Natural Resources Conservation Service provided project leadership for mapping and correlation. Washington State University provided technical development and support for the mapping model used in the wilderness areas. Fieldwork was completed in 2005. The identification legend was approved in 2005. Classification of the soils was based on the ninth edition of the “Keys to Soils Taxonomy” (USDA, 2003). Soil mapping and digitizing were completed at a scale of 1:24,000.

This publication does not include the tables of soil properties and interpretations that are traditionally associated with soil survey reports. The tables for this survey can be accessed on the Web Soil Survey at http://websoilsurvey.nrcs.usda.gov/app/. The information on the Web Soil Survey is the most current official data.

General Nature of the Survey Area

The soil survey area is located in north-central Washington (fig. 1). The total survey area is 1,707,654 acres. The majority of the area is in Okanogan County. The area is bounded by Canada on the north, by Chelan County and the Colville Indian Reservation on the south, by Ferry County on the east, and by parts of Skagit and Whatcom Counties on the west. About 817,800 acres in the survey area is designated as wilderness areas or road-less areas.

The survey area is in the forested mountains of the east slopes of the North Cascades and the Okanogan Highlands. The part of the survey area in the Okanogan Highlands is east of the Methow River and west of Ferry County. The Okanogan

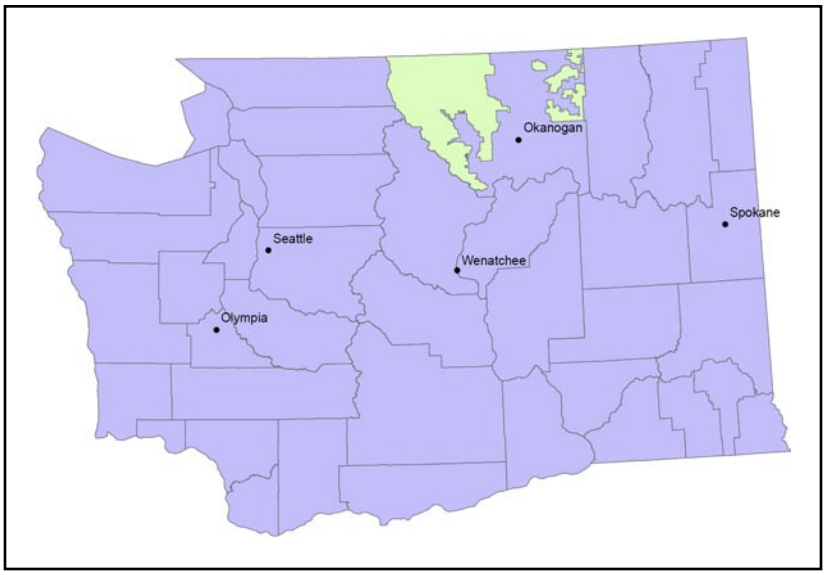

Figure 1.—Location of the survey area in Washington.

Highlands are lower mountains that have been rounded by continental glaciation. They mainly have elevations below 5,000 feet. Only a few peaks rise above 6,000 feet.

The west side of the forest touches the west slopes of the Cascade Mountains. This area has been modified by alpine glaciation and consists of dense forests, sharp ridges and peaks, glacial-trough valleys, avalanche chutes, cirque lakes, cirque basins, and extensive areas above timberline at about 7,000 feet. Elevations range from about 4,000 feet to 8,978 feet at the summit of North Gardner Mountain.

This soil survey updates a reconnaissance-level soil survey of the Okanogan National Forest published in 1977. The new survey provides additional information about the soils based on better knowledge of soils and modifications in the series concepts, intensity of mapping, and extent of soils within the survey area.

The climate varies within the survey area. The mean annual air temperature ranges from 35 to 52 degrees F. The mean annual precipitation ranges from 11 to 90 inches. The frost period ranges from 40 to 150 days. Elevation ranges from 1,300 to 8,000 feet. Vegetation varies from shrub/grassland steppes to subalpine forests. The major tree species are ponderosa pine at the lower elevations, Douglas-fir and lodgepole pine at the middle elevations, and subalpine fir, Pacific silver fir, and whitebark pine at the higher elevations.

The soils formed in materials comprised primarily of glacial till, glacial outwash, alluvium, colluvium, and residuum from various rock sources (see the section “Formation of the Soils”). The soils vary widely in texture, depth, content of rock fragments, drainage, and temperature. The majority of the soils are blanketed with a mantle of volcanic ash of varying thickness. Because of the steep topography, high content of rock fragments, and cold temperatures, most of the soils are suited mainly to wildlife habitat, timber production, recreation, livestock grazing, and watershed.

Climate

Prepared by the National Water and Climate Center, Natural Resources Conservation Service, Portland, Oregon.

The climate tables were created using data from climate stations at Mazama, Omak, and Winthrop, Washington. Thunderstorm days, relative humidity, percent

sunshine, and wind information were estimated from the first order stations at Yakima and Spokane, Washington.

Table 1 gives data on temperature and precipitation in the period 1971 to 2000. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on the length of the growing season.

In winter, the average temperature ranges between 22.9 degrees F at Mazama to 26.2 degrees at Winthrop and the average daily minimum temperature ranges from 19.2 degrees at Omak to 14.7 degrees at Winthrop. The lowest temperature on record, which occurred at Mazama on December 30, 1968, is -48 degrees F. In summer, the average temperature ranges from 64.3 degrees F at Mazama to 68.5 degrees at Omak. The average daily maximum temperature ranges from 79.2 degrees F at Mazama to 83.1 degrees at Winthrop. The highest temperature, which occurred at Omak on July 27, 1939, is 109 degrees F.

Growing degree days are shown in table 1. They 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 monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The average annual total precipitation ranges from 12.72 inches at Omak to 22.69 inches at Mazama. Of this, about 15 percent usually falls in June through September at Mazama and about 36 percent at Omak. The growing season for most crops falls within this period. The heaviest 1-day rainfall during the period of record was 5.06 inches at Mazama on November 27, 1950. Thunderstorms occur on about 7 days each year, and most occur in June.

The average seasonal snowfall is 119.7 inches at Mazama, 62.4 inches at Winthrop, and 35.4 inches at Omak. The greatest snow depth at any one time during the period of record was 62 inches recorded on January 1, 1997, at Mazama. On average, the number of days per year that have at least 1 inch of snow on the ground is 136 at Mazama, 110 at Winthrop, and 34 at Omak. The heaviest 1-day snowfall on record was 69.5 inches, recorded on January 15, 2000, at Omak.

The average relative humidity in midafternoon is about 44 percent. Humidity is higher at night, and the average at dawn is about 77 percent. The sun shines 74 percent of the time in summer and 30 percent in winter. The prevailing wind is from the west-northwest. Average wind speed is highest, 8.6 miles per hour, in April.

Additional data is available at http://www.wcc.nrcs.usda.gov/climate/.

How This Survey Was Made

By Toby Rodgers and Thor Thorson, Natural Resources Conservation Service

This soil survey was mapped at two levels of intensity: order 3 and order 4 (fig. 2). Order 3 is more intensive than order 4. A discussion of orders of soil mapping and field documentation is available in the “National Soil Survey Handbook” (USDA, no date). The level of intensity selected for mapping is based on user needs and is outlined in the memorandum of understanding between the cooperating agencies. The memorandum of understanding for conducting this soil survey provides additional guidance regarding map unit design, documentation, and minimum size of map unit polygons.

The minimum size for delineations is generally about 18 acres in the areas mapped at order 3 intensity and about 40 acres in the areas mapped at order 4 intensity. In areas that are highly important for management, however, the size can be as small as about 6 acres. In those wilderness areas (Lake Chelan Sawtooth and Pasayten) where a remote-sensing based soil-landscape model was developed for mapping, no polygons smaller than 40 acres are shown on the maps. Map units 100 through 416 are order 3 mapping intensity. Map units 700 through 714 and 900 through 927 are order 4 mapping intensity.

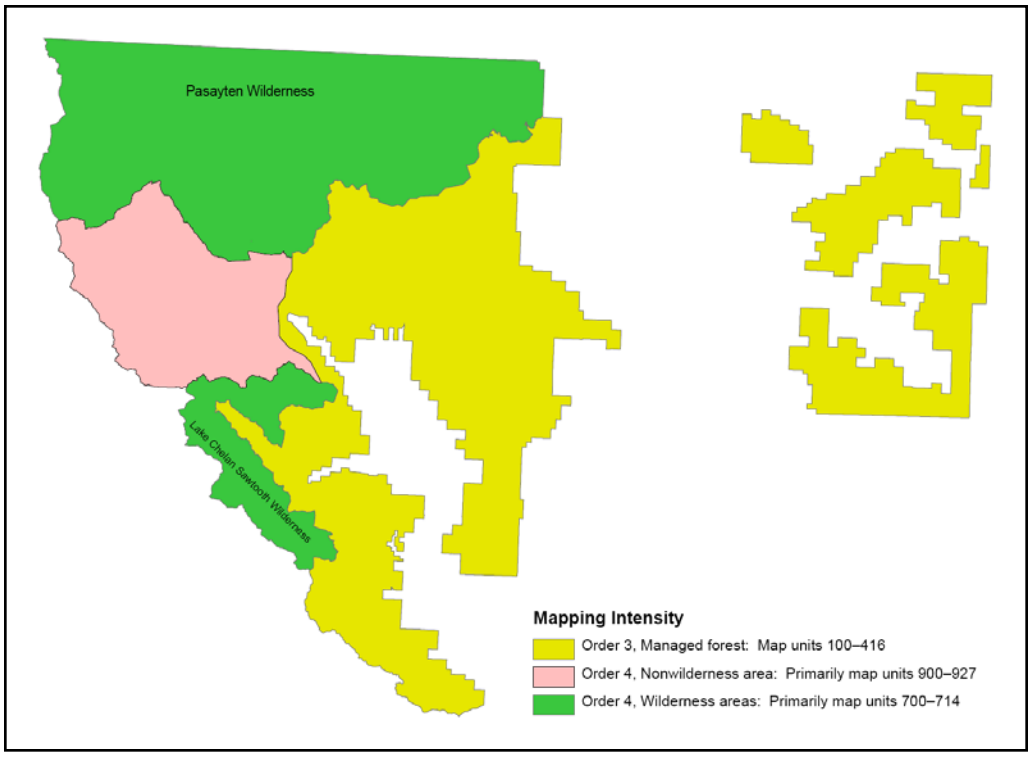

Figure 2.—Distribution of mapping intensity in the survey area.

Soil map unit components mapped at order 3 intensity are primarily soil series (for example, the Myerscreek series) with some higher taxa components (for example, Lithic Haploxerepts). Soil map unit components mapped at order 4 intensity are higher taxa components. The level of interpretive information that is available is related to the intensity of the mapping. The more intense the mapping, the more intensive the interpretations that can be inferred and developed. Map unit components in the order 3 mapping areas have plant associations correlated to the components. Map units in the order 4 mapping areas have plant association groups or series correlated to the components.

The area mapped at order 4 intensity contains the Lake Chelan Sawtooth Wilderness Area and the Pasayten Wilderness Area. These areas are shown in figure 2 in green and consist of map units 700 through 714. Physical access to these areas, which comprise about 600,000 acres, is limited. Due to the limited physical access and the less intensive need for soils information, the map units and delineations for the wilderness areas were developed and derived using a Remote Area Soil Proxy (RASP) model. This remote-sensing based soil-landscape model uses a Geographic Information System (GIS). The model was developed cooperatively as part of a research project for a master's thesis at Washington State University (Rodgers, 2000).

The purpose of the model was to consistently and rapidly delineate map unit polygons having similar patterns of climate, vegetation, landscape, landform, and topography (steepness and shape of slope). All of the map unit polygons in the wilderness areas were derived from the model. Any polygons that were derived from the model and that were less than 40 acres were not shown on the final maps. The polygon lines were plotted at 1:24,000 and were evaluated and compared to the publication-base imagery maps. Map unit polygon lines were compared to observable breaks in vegetation, topography, and landform on the imagery. In some areas, polygon lines were not coincident with changes in tonal pattern on the imagery. Using traditional mapping conventions, the lines would be coincident with the changes. The modeled

lines were not manually adjusted. Making such changes would have defeated one of the purposes for developing a model. The lack of accuracy in the placement of some lines is a negative feature of using a model for mapping. The positives features of using a model are that it is consistent and repeatable and a digital product can be generated quickly. The resource information needed for management in the wilderness areas is minimal, and modeled map products can provide a useful tool for broad planning efforts.

Following is a synopsis of the digital information used in the development of the model, the design of the map units, and the field documentation for determining map unit components. A more comprehensive discussion of the RASP model is contained in Toby Rodgers master's thesis at Washington State University (Rodgers, 2000).

The digital information used to develop the model included 30-meter digital elevation models (DEMs), 30-meter computer-based models for potential natural vegetation (PNV), 30-meter raster coverage of current vegetation, mean annual precipitation, mean annual air temperature, hydrology (lakes and streams), land type association (LTA), lithology, and 7.5-minute orthophoto quadrangles. The primary attributes derived from the DEMs were slope, aspect, profile curvature, and hill shade. The secondary attributes derived from the DEMs were flow direction, flow accumulation, and wetness index.

The map units were developed using products derived from single or multiple digital information layers. The DEMs were used for determining slope ranges for the units. The potential natural vegetation layer was used as a proxy for predicting soil climate (soil temperature and soil moisture). The land type association (LTA) layer was used for predicting parent material and landforms. The 10 landforms identified in the LTA were grouped into 3 broad categories. Group 1 consisted of glacial-cirque basins, group 2 consisted of other glacial landforms (moraines, troughs, outwash, and coulees), and group 3 consisted of the remaining mountainous slopes and ridges.

The potential natural vegetation was correlated to soil climate regimes. All soils in the glacial-cirque basins were considered udic and cryic. In the forested areas, the following correlations of vegetation to soil climate were extended into the wilderness areas from the adjoining order 3 and order 4 mapping. Douglas-fir, grand fir, and ponderosa pine were considered xeric and frigid. Douglas-fir and western hemlock were considered udic and frigid. They only occur west of the Cascade Mountains crest. Pacific silver fir, mountain hemlock, and "moist" subalpine fir (characterized by Cascade azalea) were considered udic and cryic. The areas of "moist" subalpine fir were separated from areas of "dry" subalpine fir using a combination of slope, elevation, and aspect. The "moist" areas were considered either to have slopes of over 35 percent, elevations of over 4,000 feet, and aspect of 315 to 60 degrees azimuth or to have slopes of over 35 percent, elevations of over 4,800 feet, and aspect of 61 to 314 degrees azimuth. All areas of subalpine fir that did not meet these site characteristics were considered xeric and cryic.

The forested map units were created by merging the three landform groups and the soil climate regimes. The nonforested map units (meadow-shrub) were derived using the current vegetation layer and the potential natural vegetation (PNV) layer. The PNV layer is a computer-based model for predicting potential vegetation. This model predicted potential forest vegetative types across all landscapes and current land uses. The nonforested areas that were identified using the current vegetation layer were also identified as a potential forest vegetation type in the PNV layer. The potential vegetative forest type and its correlation to soil climate were used to assign a soil climate regime to the nonforested areas. Using this process, three soil climate regimes (udic/cryic, xeric/cryic, and xeric/frigid) were identified and delineated in the nonforested areas. Once the map unit polygons were created using the soil climate and landforms, the slopes were analyzed using DEMs to develop a histogram of the slope ranges within the polygons. Based on this analysis, the polygons were further divided by dominant ranges in slope percent, slope curvature, and wetness index.

Upon creation of the soil map-unit polygons using the various digital layers, field documentation was collected to determine map unit components. Documentation was collected during the summers of 1998 and 1999. During this period, about 157 pedons were described while traversing the landscape. The pedon locations were entered into a digital layer to show the distribution of point data information. The pedons were classified to the subgroup level to determine the major soil components in the map units (Soil Survey Staff, 1999). Prior to the development of the soil-landscape model, order 4 and order 3 mapping had been completed adjacent to the wilderness areas using traditional soil mapping methods. Consequently, predictions could be made as to the soil types likely to be observed during the summer documentation period. The dominant soil orders included Inceptisols, Andisols, and Spodosols.

Table 1.--Temperature and Precipitation

[Recorded in the period 1971-2000 at Mazama, Omak, and Winthrop, Washington]

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temp. higher than--	Minimum temp. lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
MAZAMA:											
January-----	28.8	13.1	21.0	49	-20	0	3.72	1.75	5.60	8	34.6
February----	36.2	17.9	27.0	50	-12	0	2.69	1.37	4.00	7	21.2
March-------	46.2	24.8	35.5	64	3	18	1.68	0.77	2.44	4	7.4
April-------	57.6	31.3	44.4	79	18	154	1.03	0.40	1.64	3	0.3
May---------	66.7	39.7	53.2	88	26	407	1.05	0.40	1.68	3	0.0
June--------	73.7	46.3	60.0	92	32	596	1.06	0.36	1.64	3	0.0
July--------	81.8	51.1	66.4	100	35	808	0.84	0.21	1.45	2	0.0
August------	82.0	50.9	66.5	99	35	817	0.79	0.14	1.45	2	0.0
September---	72.7	41.6	57.1	92	25	513	0.83	0.13	1.53	2	0.0
October-----	56.6	31.6	44.1	78	16	161	1.48	0.38	2.52	4	1.9
November----	37.5	24.0	30.8	55	0	8	3.50	1.53	5.22	9	16.5
December----	27.5	14.2	20.8	44	-17	0	4.02	2.04	5.84	9	37.8
Yearly:											
Average---	55.6	32.2	43.9	---	---	---	----	---	---	---	---
Extreme---	103	-30	---	101	-24	---	----	---	---	---	---
Total-----	---	---	---	---	---	3,482	22.69	17.46	27.25	56	119.7
OMAK:											
January-----	28.8	15.1	21.9	48	-13	2	0.94	0.47	1.42	4	21.6
February----	37.9	22.8	30.4	56	-6	4	1.18	0.47	1.86	5	3.3
March-------	50.9	29.5	40.2	69	12	77	0.97	0.40	1.58	3	1.1
April-------	62.0	36.5	49.2	81	21	271	1.12	0.32	1.99	3	0.0
May---------	71.0	44.4	57.7	90	29	536	1.06	0.39	1.67	2	0.0
June--------	78.1	50.2	64.2	96	34	676	1.25	0.42	2.06	3	0.0
July--------	85.7	56.4	71.0	102	40	889	0.96	0.04	1.65	1	0.0
August------	84.7	55.8	70.3	102	40	902	0.67	0.09	1.11	1	0.0
September---	75.1	46.3	60.7	91	29	609	0.60	0.06	0.98	1	0.0
October-----	60.6	35.1	47.8	81	18	239	0.82	0.21	1.44	2	0.0
November----	41.4	27.5	34.4	60	7	22	1.31	0.59	1.97	6	2.1
December----	32.7	19.8	26.3	52	-2	1	1.84	0.65	2.93	7	7.2
Yearly:											
Average---	59.1	36.6	47.8	---	---	---	----	---	---	---	---
Extreme---	106	-17	---	103	-11	---	----	---	---	---	---
Total-----	---	---	---	---	---	4,230	12.72	6.90	14.17	38	35.4

Table 1.--Temperature and Precipitation--Continued

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temp. higher than--	Minimum temp. lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	*°F*	*°F*	*°F*	*°F*	*Units*	*In*	*In*	*In*		*In*
WINTHROP:											
January-----	29.7	12.6	21.1	48	-20	0	2.01	0.90	3.11	6	17.0
February----	38.3	17.6	28.0	53	-12	1	1.47	0.75	2.18	4	9.1
March-------	50.5	25.1	37.8	68	4	39	1.01	0.28	1.69	3	3.6
April-------	62.2	31.5	46.9	81	19	215	0.78	0.28	1.23	2	0.1
May---------	71.0	38.9	55.0	91	25	463	1.05	0.38	1.63	3	0.0
June--------	77.9	45.2	61.6	95	32	647	1.09	0.43	1.61	2	0.0
July--------	85.5	49.0	67.2	101	36	838	0.81	0.17	1.32	2	0.0
August------	85.8	48.5	67.2	100	35	832	0.72	0.14	1.22	1	0.0
September---	77.0	39.7	58.3	93	25	548	0.59	0.05	1.02	1	0.0
October-----	62.4	30.6	46.5	81	15	217	0.84	0.20	1.38	2	0.9
November----	40.9	24.0	32.5	60	0	17	1.95	0.81	3.09	6	8.4
December----	29.1	13.8	21.4	46	-17	0	2.52	1.04	3.84	7	23.3
Yearly:											
Average---	59.2	31.4	45.3	---	---	---	----	---	---	---	---
Extreme---	104	-30	---	101	-24	---	----	---	---	---	---
Total-----	---	---	---	---	---	3,818	14.85	11.51	17.13	39	62.4

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

Table 2.--Freeze Dates in Spring and Fall

[Recorded in the period 1971-2000 at Mazama, Omak, and Winthrop, Washington]

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
MAZAMA:			
Last freezing temperature in spring:			
1 year in 10 later than-----	Apr. 24	June 4	June 21
2 years in 10 later than----	Apr. 19	May 26	June 12
5 years in 10 later than----	Apr. 10	May 8	May 27
First freezing temperature in fall:			
1 year in 10 earlier than---	Sep. 29	Sep. 17	Sep. 3
2 years in 10 earlier than--	Oct. 5	Sep. 21	Sep. 9
5 years in 10 earlier than--	Oct. 16	Sep. 30	Sep. 19
OMAK:			
Last freezing temperature in spring:			
1 year in 10 later than-----	Apr. 25	May 7	May 29
2 years in 10 later than----	Apr. 15	Apr. 30	May 21
5 years in 10 later than----	Mar. 28	Apr. 17	May 7
First freezing temperature in fall:			
1 year in 10 earlier than---	Oct. 8	Sep. 26	Sep. 12
2 years in 10 earlier than--	Oct. 13	Oct. 1	Sep. 18
5 years in 10 earlier than--	Oct. 21	Oct. 10	Sep. 29
WINTHROP:			
Last freezing temperature in spring:			
1 year in 10 later than-----	May 5	May 21	June 16
2 years in 10 later than----	Apr. 29	May 15	June 9
5 years in 10 later than----	Apr. 16	May 4	May 25
First freezing temperature in fall:			
1 years in 10 earlier than--	Sep. 27	Sep. 16	Sep. 2
2 years in 10 earlier than--	Oct. 2	Sep. 21	Sep. 7
5 years in 10 earlier than--	Oct. 11	Sep. 30	Sep. 16

Table 3.--Growing Season

[Recorded in the period 1971-2000 at Mazama, Omak, and Winthrop, Washington]

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	*Days*	*Days*
MAZAMA:			
9 years in 10	165	108	85
8 years in 10	173	121	95
5 years in 10	189	145	115
2 years in 10	205	169	135
1 year in 10	214	181	145
OMAK:			
9 years in 10	166	137	108
8 years in 10	180	150	120
5 years in 10	207	175	141
2 years in 10	233	199	162
1 year in 10	247	212	174
WINTHROP:			
9 years in 10	151	124	91
8 years in 10	160	133	98
5 years in 10	176	150	113
2 years in 10	192	167	128
1 year in 10	200	177	136

Detailed Soil Map Units

The map units delineated on the detailed soil maps for this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the information on the Web Soil Survey, 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. Soil maps and tables of soil properties and interpretations are available on the Web Soil Survey at http://websoilsurvey.nrcs.usda.gov/app/.

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 similar soils. They are not mentioned in the map unit descriptions. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called 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 dissimilar components are mentioned in the map unit descriptions. In some map units, minor amounts of dissimilar components were observed in which the soil properties of the components were not similar to a named soil. These components are designated as “unnamed dissimilar minor components.” In the map units where these components occur, the total percent composition of the map unit may be less than 100 percent.

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*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. The soils of a given 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, Aits ashy loam, 15 to 35 percent slopes, is a phase of the Aits series.

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

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Finney-Banker complex, 35 to 65 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Typic Vitricryands-Andic Haplocryods-Fulvicryands association, 35 to 90 percent slopes, is an example.

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

The major land resource area (MLRA) for each detailed soil map unit is given in this section under the heading “Map Unit Setting” (USDA–NRCS, 2006). Some map units, such as Rock outcrop, Water, and other miscellaneous areas, may not be assigned to a single MLRA because the unit can occur in any MLRA.

The table “Acreage and Proportionate Extent of the Soils” lists the map units in this survey area. The Glossary defines many of the terms used in describing the soils.

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Chelan County	Okanogan County	Skagit County	Whatcom County	Total Area	Total Extent
		Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Pct*
100	Aits ashy loam, 15 to 35 percent slopes	---	350	---	---	350	*
101	Andic Dystrocryepts-Aquic Dystrocryepts complex, 0 to 35 percent slopes	---	489	---	---	489	*
102	Andic Dystrocryepts-Rock outcrop-Rubble land complex, 35 to 90 percent slopes	---	6,314	---	---	6,314	0.4
103	Andic Dystrocryepts-Vitrandic Dystrocryepts complex, 15 to 35 percent slopes	---	1,451	---	---	1,451	*
104	Andic Dystrocryepts-Vitrandic Dystrocryepts complex, 35 to 90 percent slopes	---	4,770	---	---	4,770	0.3
105	Andic Eutrocryepts-Cryaquolls complex, 0 to 35 percent slopes	---	1,843	---	---	1,843	0.1
106	Anglen ashy loam, 0 to 15 percent slopes	---	94	---	---	94	*
107	Anglen ashy loam, 35 to 65 percent slopes	---	55	---	---	55	*
108	Aquandic Cryaquepts, 0 to 3 percent slopes	---	13	---	---	13	*
109	Aquandic Endoaquolls, 0 to 5 percent slopes	---	388	---	---	388	*
110	Aquandic Endoaquolls-Haplosaprists complex, 0 to 10 percent slopes	---	1,732	---	---	1,732	0.1
111	Aquandic Xerofluvents, 0 to 5 percent slopes	---	2,470	---	---	2,470	0.1
112	Aquic Dystrocryepts, 0 to 15 percent slopes	---	1,246	---	---	1,246	*
113	Ashnola gravelly ashy sandy loam, 15 to 35 percent slopes	---	1,292	---	---	1,292	*

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Chelan County	Okanogan County	Skagit County	Whatcom County	Total	
						Area	Extent
		Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Pct*
114	Ashnola gravelly ashy sandy loam, 35 to 65 percent slopes	---	448	---	---	448	*
115	Baldknob-Rock outcrop complex, 35 to 90 percent slopes	---	2,972	---	---	2,972	0.2
116	Baldknob-Thout-Nicmar complex, 15 to 65 percent slopes	---	5,545	---	---	5,545	0.3
117	Bearspring gravelly ashy sandy loam, 35 to 65 percent slopes	---	749	---	---	749	*
118	Bluebuck stony ashy sandy loam, 35 to 65 percent slopes	---	7,048	---	---	7,048	0.4
119	Boesel fine sandy loam, 0 to 3 percent slopes	---	1,540	---	---	1,540	*
120	Bong ashy sandy loam, 35 to 65 percent slopes	---	322	---	---	322	*
121	Borgeau-Johntom-Rock outcrop complex, 35 to 65 percent slopes	---	2,600	---	---	2,600	0.2
122	Borgeau-Nicmar-Johntom complex, 15 to 35 percent slopes	---	1,616	---	---	1,616	*
123	Brevco-Lithic Haploxerepts-Rock outcrop complex, 15 to 35 percent slopes	---	2,270	---	---	2,270	0.1
124	Brevco-Lithic Haploxerepts-Rock outcrop complex, 35 to 65 percent slopes	---	13,424	---	---	13,424	0.8
125	Brevco-Lithic Haploxerepts-Rock outcrop complex, dry, 35 to 65 percent slopes	---	1,976	---	---	1,976	0.1
126	Bromas-Rock outcrop complex, 35 to 65 percent slopes	---	518	---	---	518	*
127	Bromas-Sitdown complex, 35 to 65 percent slopes	---	3,081	---	---	3,081	0.2
128	Burpeak-Rock outcrop complex, 65 to 90 percent slopes	---	1,557	---	---	1,557	*
129	Buttoncreek gravelly ashy fine sandy loam, 5 to 25 percent slopes	---	508	---	---	508	*
130	Cassal ashy loam, 5 to 25 percent slopes	---	2,214	---	---	2,214	0.1
131	Chewack-Sitdown-Rock outcrop complex, 35 to 65 percent slopes	---	5,032	---	---	5,032	0.3
132	Chumstick-Mineral-Rock outcrop complex, 15 to 35 percent slopes	---	6,644	---	---	6,644	0.4
133	Chumstick-Mineral-Rock outcrop complex, 35 to 65 percent slopes	---	4,699	---	---	4,699	0.3
134	Chumstick-Rock outcrop complex, 35 to 65 percent slopes	---	2,053	---	---	2,053	0.1
135	Conconully ashy loam, 0 to 8 percent slopes	---	17	---	---	17	*
136	Conconully ashy loam, 8 to 15 percent slopes	---	115	---	---	115	*
137	Conconully ashy loam, 15 to 25 percent slopes	---	77	---	---	77	*
138	Conconully gravelly ashy sandy loam, 3 to 8 percent slopes	---	28	---	---	28	*
139	Conconully gravelly ashy sandy loam, 8 to 25 percent slopes	---	60	---	---	60	*
140	Conconully extremely stony ashy loam, 0 to 25 percent slopes	---	286	---	---	286	*
141	Conconully extremely stony ashy loam, 25 to 65 percent north slopes	---	106	---	---	106	*
142	Conconully extremely stony ashy loam, 25 to 65 percent south slopes	---	57	---	---	57	*
143	Coopmont-Wocreek complex, 35 to 65 percent slopes	---	3,092	---	---	3,092	0.2
144	Coxit-Pelican complex, 15 to 35 percent slopes	---	948	---	---	948	*
145	Coxit-Pelican complex, 35 to 65 percent slopes	---	671	---	---	671	*
146	Crocamp gravelly ashy sandy loam, 0 to 15 percent slopes	---	54	---	---	54	*

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Chelan County	Okanogan County	Skagit County	Whatcom County	Total	
						Area	Extent
		Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Pct*
147	Crocamp-Burget complex, 15 to 35 percent slopes	---	728	---	---	728	*
148	Crocamp-Burget complex, 35 to 65 percent slopes	---	1,412	---	---	1,412	*
149	Crocamp-Lithic Dystrocryepts-Rock outcrop complex, 35 to 90 percent slopes	---	1,567	---	---	1,567	*
150	Cryofluvents, 0 to 5 percent slopes	---	2,162	---	---	2,162	0.1
151	Cubhill-Johntom complex, 15 to 35 percent slopes	---	1,341	---	---	1,341	*
152	Devore-Rock outcrop complex, 15 to 35 percent slopes	---	2,204	---	---	2,204	0.1
153	Devore-Rock outcrop complex, warm, 15 to 35 percent slopes	---	2,693	---	---	2,693	0.2
154	Devore-Rock outcrop complex, warm, 35 to 65 percent slopes	---	5,055	---	---	5,055	0.3
155	Devore-Treebutte complex, 0 to 15 percent slopes	---	3,733	---	---	3,733	0.2
156	Devore-Treebutte-Rock outcrop complex, 15 to 35 percent slopes	---	9,568	---	---	9,568	0.6
157	Devore-Treebutte-Rock outcrop complex, 35 to 65 percent slopes	---	4,900	---	---	4,900	0.3
158	Doe-Wellie-Rock outcrop complex, 35 to 65 percent slopes	---	1,110	---	---	1,110	*
159	Donavan ashy loam, 3 to 15 percent slopes	---	837	---	---	837	*
160	Donavan ashy loam, 8 to 25 percent slopes	---	75	---	---	75	*
161	Donavan ashy sandy loam, 15 to 35 percent slopes	---	397	---	---	397	*
162	Donavan-Rock outcrop complex, 25 to 65 percent slopes	---	127	---	---	127	*
163	Enson ashy sandy loam, 15 to 35 percent slopes	---	941	---	---	941	*
164	Farway gravelly ashy sandy loam, 15 to 35 percent slopes	---	4,586	---	---	4,586	0.3
165	Fears-Rock outcrop complex, 50 to 90 percent slopes	---	788	---	---	788	*
166	Finney-Banker complex, 35 to 65 percent slopes	---	10,175	---	---	10,175	0.6
167	Finney-Myerscreek complex, 15 to 35 percent slopes	---	1,368	---	---	1,368	*
168	Gahee ashy loam, 0 to 15 percent slopes	---	152	---	---	152	*
169	Gatewall ashy sandy loam, 15 to 35 percent slopes	---	5,461	---	---	5,461	0.3
170	Gatewall ashy sandy loam, 35 to 65 percent slopes	---	3,441	---	---	3,441	0.2
171	Gatewall ashy sandy loam, warm, 35 to 65 percent slopes	---	1,017	---	---	1,017	*
172	Gatewall-Volmont complex, 35 to 65 percent slopes	---	3,763	---	---	3,763	0.2
173	Goddard-Lithic Haploxerepts complex, 0 to 15 percent slopes	---	2,412	---	---	2,412	0.1
174	Goddard-Parmenter complex, 0 to 15 percent slopes	---	2,983	---	---	2,983	0.2
175	Goddard-Parmenter complex, 15 to 35 percent slopes	---	581	---	---	581	*
176	Granflat gravelly ashy sandy loam, 0 to 10 percent slopes	---	943	---	---	943	*
177	Granflat gravelly ashy sandy loam, warm, 0 to 10 percent slopes	---	1,795	---	---	1,795	0.1
178	Growden ashy fine sandy loam, 15 to 35 percent slopes	---	131	---	---	131	*

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Chelan County	Okanogan County	Skagit County	Whatcom County	Total	
						Area	Extent
		Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Pct*
179	Growden ashy fine sandy loam, 35 to 65 percent slopes	---	37	---	---	37	*
180	Growden-Pepoon-Oxerine complex, 15 to 65 percent slopes	---	44	---	---	44	*
181	Histic Cryaquepts-Cryohemists complex, 0 to 10 percent slopes	18	1,507	---	---	1,525	*
182	Hodgson ashy silt loam, 3 to 15 percent slopes	---	24	---	---	24	*
183	Inkler gravelly ashy silt loam, 15 to 35 percent slopes	---	11	---	---	11	*
184	Jantill-Rock outcrop complex, 15 to 35 percent slopes	---	595	---	---	595	*
185	Jimbluff ashy sandy loam, 15 to 35 percent slopes	---	1,441	---	---	1,441	*
186	Jimbluff gravelly ashy sandy loam, 5 to 25 percent slopes	---	668	---	---	668	*
187	Johntom-Borgeau-Rock outcrop complex, 15 to 35 percent slopes	---	1,682	---	---	1,682	*
188	Johntom-Foggydew-Rock outcrop complex, 35 to 75 percent slopes	---	23,116	---	---	23,116	1.4
189	Johntom-Rock outcrop complex, 15 to 35 percent slopes	---	908	---	---	908	*
190	Johntom-Rock outcrop complex, 35 to 65 percent slopes	---	1,059	---	---	1,059	*
191	Kartar ashy sandy loam, 3 to 15 percent slopes	---	16	---	---	16	*
192	Kartar ashy sandy loam, 15 to 45 percent slopes	---	163	---	---	163	*
193	Kartar stony ashy sandy loam, 0 to 25 percent slopes	---	96	---	---	96	*
194	Kartar stony ashy sandy loam, 25 to 65 percent slopes	---	67	---	---	67	*
195	Karu gravelly ashy sandy loam, 35 to 65 percent slopes	---	728	---	---	728	*
196	Karu stony ashy sandy loam, 35 to 65 percent slopes	---	684	---	---	684	*
197	Koepke ashy loam, 15 to 35 percent slopes	---	501	---	---	501	*
198	Lani stony ashy sandy loam, 25 to 65 percent slopes	---	293	---	---	293	*
199	Leftcreek-Rock outcrop complex, 35 to 65 percent slopes	---	4,918	---	---	4,918	0.3
200	Leiko stony ashy sandy loam, 3 to 15 percent slopes	---	665	---	---	665	*
201	Lekrem gravelly ashy sandy loam, 15 to 35 percent slopes	---	981	---	---	981	*
202	Lekrem stony ashy sandy loam, 15 to 35 percent slopes	---	1,008	---	---	1,008	*
203	Lekrem-Chumstick-Rock outcrop complex, 35 to 65 percent slopes	---	7,124	---	---	7,124	0.4
204	Leonardo ashy fine sandy loam, 35 to 65 percent slopes	---	16	---	---	16	*
205	Limking-Rock outcrop complex, 30 to 60 percent slopes	---	83	---	---	83	*
206	Lithic Dystrocryepts-Rock outcrop complex, 35 to 65 percent slopes	---	2,997	---	---	2,997	0.2
207	Lithic Eutrocryepts-Rock outcrop-Resner complex, 15 to 35 percent slopes	---	1,434	---	---	1,434	*
208	Lithic Haploxerepts-Conconully complex, 15 to 45 percent slopes	---	529	---	---	529	*

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Chelan County	Okanogan County	Skagit County	Whatcom County	Total	
						Area	Extent
		Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Pct*
209	Lithic Haploxerepts-Donavan-Rock outcrop complex, 15 to 45 percent slopes	---	3,424	---	---	3,424	0.2
210	Lithic Haploxerepts-Kartar complex, 15 to 45 percent slopes	---	53	---	---	53	*
211	Lithic Haploxerepts-Newbon complex, 15 to 45 percent slopes	---	104	---	---	104	*
212	Lithic Haploxerepts-Rock outcrop complex, 15 to 90 percent slopes	---	1,444	---	---	1,444	*
213	Lithic Haploxerepts-Wapal-Rock outcrop complex, 35 to 65 percent slopes	---	1,507	---	---	1,507	*
214	Lithic Haploxerepts-Wilma-Rock outcrop complex, 35 to 65 percent slopes	---	9,374	---	---	9,374	0.5
215	Longort gravelly ashy sandy loam, 15 to 35 percent slopes	---	4,116	---	---	4,116	0.2
216	Longort gravelly ashy sandy loam, 35 to 65 percent slopes	---	3,207	---	---	3,207	0.2
217	Longort-Santop complex, 35 to 65 percent slopes	---	5,401	---	---	5,401	0.3
218	Longswamp ashy loam, 15 to 35 percent slopes	---	149	---	---	149	*
219	Louploup-Stepstone complex, 3 to 15 percent slopes	---	6,629	---	---	6,629	0.4
220	Louploup-Stepstone complex, 15 to 35 percent slopes	---	5,593	---	---	5,593	0.3
221	Manley ashy fine sandy loam, 0 to 15 percent slopes	---	1,211	---	---	1,211	*
222	Manley ashy fine sandy loam, 15 to 35 percent slopes	---	6,646	---	---	6,646	0.4
223	Manley-Devore complex, 15 to 35 percent slopes	---	10,820	---	---	10,820	0.6
224	Manley-Devore complex, 35 to 65 percent slopes	---	11,645	---	---	11,645	0.7
225	Martella ashy fine sandy loam, 0 to 20 percent slopes	---	526	---	---	526	*
226	McCay gravelly ashy sandy loam, 15 to 35 percent slopes	---	1,108	---	---	1,108	*
227	McCay-Rock outcrop complex, 35 to 65 percent slopes	---	615	---	---	615	*
228	Merkel ashy sandy loam, 5 to 20 percent slopes	---	254	---	---	254	*
229	Merkel ashy sandy loam, 15 to 35 percent slopes	---	8,192	---	---	8,192	0.5
230	Merkel cobbly ashy sandy loam, 35 to 65 percent slopes	---	3,197	---	---	3,197	0.2
231	Merkel-Lithic Haploxerepts-Rock outcrop complex, 15 to 35 percent slopes	---	7,147	---	---	7,147	0.4
232	Merkel-Wilma complex, 35 to 65 percent slopes	---	4,925	---	---	4,925	0.3
233	Midpeak-Johntom-Rock outcrop complex, 35 to 65 percent slopes	---	3,778	---	---	3,778	0.2
234	Mineral-Rock outcrop complex, 20 to 40 percent slopes	---	136	---	---	136	*
235	Molson ashy silt loam, 25 to 40 percent slopes	---	41	---	---	41	*
236	Muckamuck silt loam, 0 to 3 percent slopes	---	314	---	---	314	*
237	Myerscreek ashy fine sandy loam, 15 to 35 percent slopes	---	9,317	---	---	9,317	0.5
238	Myerscreek ashy fine sandy loam, 35 to 65 percent slopes	---	2,961	---	---	2,961	0.2
239	Myerscreek stony ashy fine sandy loam, 5 to 35 percent slopes	---	2,026	---	---	2,026	0.1

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Chelan County	Okanogan County	Skagit County	Whatcom County	Total	
						Area	Extent
		Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Pct*
240	Myerscreek stony ashy fine sandy loam, 15 to 35 percent slopes	---	542	---	---	542	*
241	Myerscreek stony ashy fine sandy loam, 35 to 65 percent slopes	---	5,429	---	---	5,429	0.3
242	Myerscreek stony ashy fine sandy loam, warm, 35 to 65 percent slopes	---	3,922	---	---	3,922	0.2
243	Myerscreek-Aquic Dystrocryepts complex, 0 to 25 percent slopes	---	6,442	---	---	6,442	0.4
244	Myerscreek-Devore complex, 15 to 35 percent slopes	---	19,251	---	---	19,251	1.1
245	Myerscreek-Devore complex, 35 to 65 percent slopes	---	10,081	---	---	10,081	0.6
246	Myerscreek-Devore complex, warm, 15 to 35 percent slopes	---	2,616	---	---	2,616	0.2
247	Myerscreek-Finney complex, 35 to 65 percent slopes	---	1,705	---	---	1,705	*
248	Myerscreek-Histic Cryaquepts-Cryohemists complex, 0 to 15 percent slopes	---	2,185	---	---	2,185	0.1
249	Myerscreek-Manley complex, 15 to 35 percent slopes	---	6,732	---	---	6,732	0.4
250	Myerscreek-Twentymile complex, 15 to 35 percent slopes	---	10,702	---	---	10,702	0.6
251	Nahahum ashy loam, 0 to 15 percent slopes	---	599	---	---	599	*
252	Nahahum ashy loam, 15 to 35 percent slopes	---	757	---	---	757	*
253	Nahahum ashy loam, cool, 15 to 35 percent slopes	---	884	---	---	884	*
254	Nahahum-Coxit complex, 15 to 35 percent slopes	---	1,774	---	---	1,774	0.1
255	Nahahum-Coxit complex, 35 to 65 percent slopes	---	304	---	---	304	*
256	Nanamkin gravelly sandy loam, 0 to 15 percent slopes	---	19	---	---	19	*
257	Nevine ashy silt loams association, 5 to 20 percent slopes	---	1,448	---	---	1,448	*
258	Nevine ashy silt loams association, 20 to 40 percent slopes	---	775	---	---	775	*
259	Nevine ashy silt loams association, 40 to 65 percent slopes	---	113	---	---	113	*
260	Nevine-Louploup complex, 3 to 15 percent slopes	---	6,351	---	---	6,351	0.4
261	Nevine-Louploup complex, 15 to 35 percent slopes	---	14,133	---	---	14,133	0.8
262	Nevine-Louploup complex, moist, 15 to 35 percent slopes	---	5,134	---	---	5,134	0.3
263	Nevine-Merkel complex, 15 to 35 percent slopes	---	31,328	---	---	31,328	1.8
264	Nevine-Merkel complex, 35 to 65 percent slopes	---	7,524	---	---	7,524	0.4
265	Nevine-Oxerine complex, 35 to 65 percent slopes	---	1,127	---	---	1,127	*
266	Nevine-Wilma complex, 15 to 35 percent slopes	---	4,910	---	---	4,910	0.3
267	Nevine-Wilma complex, 35 to 65 percent slopes	---	9,273	---	---	9,273	0.5
268	Nevine-Wilma-Rock outcrop complex, 15 to 35 percent slopes	---	23,539	---	---	23,539	1.4
269	Newbon gravelly loam, 8 to 25 percent slopes	---	261	---	---	261	*
270	Newbon gravelly loam, 25 to 45 percent slopes	---	122	---	---	122	*
271	Newbon gravelly loam, 25 to 45 percent north slopes	---	35	---	---	35	*
272	Newbon stony loam, 0 to 45 percent slopes	---	98	---	---	98	*

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Chelan County	Okanogan County	Skagit County	Whatcom County	Total	
						Area	Extent
		Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Pct*
273	Newbon very gravelly loam, 25 to 65 percent slopes, eroded	---	231	---	---	231	*
274	Newhorn ashy fine sandy loam, 15 to 35 percent slopes	---	3,495	---	---	3,495	0.2
275	Newhorn ashy fine sandy loam, moist, 15 to 35 percent slopes	---	1,940	---	---	1,940	0.1
276	Nicmar ashy loam, 15 to 35 percent slopes	---	1,923	---	---	1,923	0.1
277	Nicmar gravelly ashy loam, 15 to 35 percent slopes	---	2,066	---	---	2,066	0.1
278	Nicmar-Baldknob-Rock outcrop complex, 35 to 65 percent slopes	---	4,588	---	---	4,588	0.3
279	Nicmar-Santop complex, 35 to 65 percent slopes	---	5,142	---	---	5,142	0.3
280	Ortellcreek gravelly ashy sandy loam, 15 to 35 percent slopes	---	2,553	---	---	2,553	0.1
281	Ortellcreek gravelly ashy sandy loam, 35 to 65 percent slopes	---	727	---	---	727	*
282	Oxerine ashy fine sandy loam, 35 to 65 percent slopes	---	356	---	---	356	*
283	Oxerine-Lithic Haploxerepts-Rock outcrop complex, 35 to 65 percent slopes	---	2,407	---	---	2,407	0.1
284	Oxerine-Nevine complex, 35 to 65 percent slopes	---	7,562	---	---	7,562	0.4
285	Oxerine-Rock outcrop complex, 35 to 65 percent slopes	---	1,677	---	---	1,677	*
286	Pebcreek stony ashy sandy loam, 15 to 35 percent slopes	---	3,471	---	---	3,471	0.2
287	Pebcreek stony ashy sandy loam, dry, 15 to 35 percent slopes	---	771	---	---	771	*
288	Pebcreek-Brevco complex, 15 to 35 percent slopes	---	4,121	---	---	4,121	0.2
289	Pebcreek-Brevco complex, 35 to 65 percent slopes	---	17,724	---	---	17,724	1.0
290	Pebcreek-Lithic Haploxerepts-Rock outcrop complex, 35 to 65 percent slopes	---	1,658	---	---	1,658	*
291	Peka ashy sandy loam, 15 to 35 percent slopes	---	408	---	---	408	*
292	Peka-Donavan complex, 15 to 35 percent slopes	---	3,075	---	---	3,075	0.2
293	Peka-Swakane-Rock outcrop complex, 35 to 65 percent slopes	---	4,893	---	---	4,893	0.3
294	Pelican gravelly ashy loam, 35 to 65 percent slopes	---	88	---	---	88	*
295	Pepoon-Edds complex, 15 to 50 percent slopes	---	358	---	---	358	*
296	Pepoon-Togo complex, 15 to 50 percent slopes	---	29	---	---	29	*
297	Pettijohn-Mineral-Rock outcrop complex, 35 to 65 percent slopes	---	2,070	---	---	2,070	0.1
298	Pettijohn-Rock outcrop complex, 35 to 65 percent slopes	---	1,054	---	---	1,054	*
299	Pettijohn-Wilma complex, 35 to 65 percent slopes	---	1,727	---	---	1,727	0.1
300	Radercreek-Santop complex, 35 to 65 percent slopes	---	17,497	---	---	17,497	1.0
301	Redpeak-Ontrail complex, 35 to 65 percent slopes	---	802	---	---	802	*
302	Remmel-Devore-Rock outcrop complex, 35 to 65 percent slopes	---	8,434	---	---	8,434	0.5
303	Remmel-Rock outcrop complex, 35 to 65 percent slopes	---	2,756	---	---	2,756	0.2
304	Rendovy gravelly ashy fine sandy loam, 15 to 35 percent slopes	---	443	---	---	443	*

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Chelan County	Okanogan County	Skagit County	Whatcom County	Total	
						Area	Extent
		Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Pct*
305	Rendovy-Goshawk complex, 35 to 65 percent slopes	---	3,524	---	---	3,524	0.2
306	Republic ashy loam, 0 to 15 percent slopes	---	1,136	---	---	1,136	*
307	Republic ashy loam, 15 to 35 percent slopes	---	1,888	---	---	1,888	0.1
308	Republic-Pelican complex, 35 to 65 percent slopes	---	307	---	---	307	*
309	Resner ashy loam, 0 to 20 percent slopes	---	193	---	---	193	*
310	Resner ashy loam, 20 to 40 percent slopes	---	258	---	---	258	*
311	Resner-Sitdown complex, 0 to 15 percent slopes	---	4,492	---	---	4,492	0.3
312	Resner-Sitdown complex, 15 to 35 percent slopes	---	4,013	---	---	4,013	0.2
313	Resner-Sitdown complex, 35 to 65 percent slopes	---	1,810	---	---	1,810	0.1
314	Ret silt loam, 0 to 3 percent slopes	---	91	---	---	91	*
315	Riverwash-Water complex, 0 to 2 percent slopes	---	439	---	---	439	*
316	Rock outcrop-Donavan-Peka complex, 15 to 35 percent slopes	---	227	---	---	227	*
317	Rock outcrop-Lithic Eutrocryepts-Rubble land complex, 35 to 90 percent slopes	---	4,837	---	---	4,837	0.3
318	Rock outcrop-Rubble land complex, 5 to 100 percent slopes	1,626	29,643	4,154	5,846	41,269	2.4
319	Rock outcrop-Wellie-Rubble land complex, 65 to 90 percent slopes	---	6,143	---	---	6,143	0.4
320	Rufus-Wynhoff-Rock outcrop complex, 35 to 65 percent slopes	---	834	---	---	834	*
321	Sacheen loamy sand, 15 to 35 percent slopes	---	262	---	---	262	*
322	Sacheen loamy sand, 35 to 65 percent slopes	---	423	---	---	423	*
323	Salcreek ashy loam, 15 to 35 percent slopes	---	167	---	---	167	*
324	Salcreek ashy loam, 35 to 65 percent slopes	---	352	---	---	352	*
325	Scheiner-Myerscreek complex, 35 to 65 percent slopes	---	776	---	---	776	*
326	Scoap gravelly ashy loam, 15 to 35 percent slopes	---	911	---	---	911	*
327	Setill ashy loam, 35 to 65 percent slopes	---	251	---	---	251	*
328	Setill-Johntom complex, 15 to 35 percent slopes	---	1,229	---	---	1,229	*
329	Shalrock-Johntom complex, 35 to 65 percent slopes	---	15,575	---	---	15,575	0.9
330	Shalrock-Rock outcrop complex, 15 to 35 percent slopes	---	995	---	---	995	*
331	Shalrock-Rock outcrop complex, 35 to 65 percent slopes	---	2,944	---	---	2,944	0.2
332	Shermount-Verhart complex, 15 to 35 percent slopes	---	2,075	---	---	2,075	0.1
333	Shermount-Verhart complex, 35 to 65 percent slopes	---	1,008	---	---	1,008	*
334	Sitdown stony ashy sandy loam, 0 to 15 percent slopes	---	2,912	---	---	2,912	0.2
335	Sitdown stony ashy sandy loam, 15 to 35 percent slopes	---	4,996	---	---	4,996	0.3
336	Sitdown-Rock outcrop complex, 15 to 35 percent slopes	---	953	---	---	953	*
337	Sitdown-Rock outcrop complex, 35 to 65 percent slopes	---	2,129	---	---	2,129	0.1
338	Sitdown-Wellsfar-Rock outcrop complex, 15 to 35 percent slopes	---	2,697	---	---	2,697	0.2
339	Smokejump-Jantill complex, 35 to 65 percent slopes	---	3,891	---	---	3,891	0.2

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Chelan County	Okanogan County	Skagit County	Whatcom County	Total	
						Area	Extent
		Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Pct*
340	Smokejump-Twentymile complex, 15 to 35 percent slopes	---	5,421	---	---	5,421	0.3
341	Springdale cobbly ashy coarse sandy loam, 15 to 35 percent slopes	---	729	---	---	729	*
342	Springdale-Rock outcrop complex, 35 to 65 percent slopes	---	820	---	---	820	*
343	Stapaloop ashy fine sandy loam, 0 to 25 percent slopes	---	1,189	---	---	1,189	*
344	Stemilt-Midpeak complex, 35 to 65 percent slopes	---	3,752	---	---	3,752	0.2
345	Stepstone ashy fine sandy loam, 3 to 15 percent slopes	---	2,610	---	---	2,610	0.2
346	Stepstone ashy fine sandy loam, 15 to 35 percent slopes	---	7,177	---	---	7,177	0.4
347	Stepstone-Torboy complex, 0 to 15 percent slopes	---	6,861	---	---	6,861	0.4
348	Storer-Swakane-Rock outcrop complex, 35 to 75 percent slopes	---	4,821	---	---	4,821	0.3
349	Surgh very stony ashy sandy loam, 15 to 35 percent slopes	---	106	---	---	106	*
350	Surgh very stony ashy sandy loam, 35 to 65 percent slopes	---	2,630	---	---	2,630	0.2
351	Surgh-Rock outcrop complex, 35 to 65 percent slopes	---	2,105	---	---	2,105	0.1
352	Swakane-Peka-Rock outcrop complex, 15 to 35 percent slopes	---	1,089	---	---	1,089	*
353	Swakane-Rock outcrop complex, 35 to 75 percent slopes	---	2,820	---	---	2,820	0.2
354	Swakane-Rock outcrop-Peka complex, 35 to 65 percent slopes	---	1,153	---	---	1,153	*
355	Sycreek ashy loam, 5 to 35 percent slopes	---	2,151	---	---	2,151	0.1
356	Thout-Rock outcrop complex, 15 to 35 percent slopes	---	739	---	---	739	*
357	Thout-Rock outcrop complex, 35 to 65 percent slopes	---	1,421	---	---	1,421	*
358	Thout-Rock outcrop complex, cool, 35 to 65 percent slopes	---	1,982	---	---	1,982	0.1
359	Thow-Vingulch complex, 35 to 65 percent slopes	---	10,270	---	---	10,270	0.6
360	Thowson ashy coarse sandy loam, 15 to 35 percent slopes	---	739	---	---	739	*
361	Thrapp-Aquandic Xerofluvents complex, 0 to 35 percent slopes	---	2,394	---	---	2,394	0.1
362	Thuso ashy loam, 15 to 35 percent slopes	---	734	---	---	734	*
363	Thuso ashy loam, 35 to 65 percent slopes	---	420	---	---	420	*
364	Thuso ashy sandy loam, 35 to 65 percent slopes	---	209	---	---	209	*
365	Thuso-Lithic Haploxerepts-Rock outcrop complex, 35 to 65 percent slopes	---	2,153	---	---	2,153	0.1
366	Toats-Longswamp complex, 15 to 35 percent slopes	---	1,355	---	---	1,355	*
367	Togo ashy loam, 15 to 35 percent slopes	---	20	---	---	20	*
368	Togo ashy loam, 35 to 65 percent slopes	---	43	---	---	43	*
369	Togo-Bamber complex, 35 to 65 percent slopes	---	126	---	---	126	*
370	Togo-Rock outcrop complex, 15 to 50 percent slopes	---	49	---	---	49	*
371	Torboy cobbly ashy sandy loam, 25 to 65 percent slopes	---	120	---	---	120	*
372	Twentymile ashy fine sandy loam, 15 to 35 percent slopes	---	1,129	---	---	1,129	*

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Chelan County	Okanogan County	Skagit County	Whatcom County	Total	
						Area	Extent
		Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Pct*
373	Vallan-Rock outcrop complex, 15 to 50 percent slopes	---	138	---	---	138	*
374	Vanbrunt-Swakane-Rock outcrop complex, 35 to 65 percent slopes	---	7,015	---	---	7,015	0.4
375	Venson gravelly ashy sandy loam, 35 to 65 percent slopes	---	443	---	---	443	*
376	Verhart-Rock outcrop complex, 35 to 65 percent slopes	---	3,500	---	---	3,500	0.2
377	Verhart-Rock outcrop complex, cold, 35 to 65 percent slopes	---	1,388	---	---	1,388	*
378	Veridge-Farway complex, 35 to 65 percent slopes	---	5,868	---	---	5,868	0.3
379	Veridge-Farway complex, moist, 35 to 65 percent slopes	---	8,143	---	---	8,143	0.5
380	Veridge-Rock outcrop complex, 35 to 65 percent slopes	---	2,664	---	---	2,664	0.2
381	Vinegar ashy sandy loam, 0 to 5 percent slopes	---	126	---	---	126	*
382	Vinegar-Thow complex, 15 to 35 percent slopes	---	8,339	---	---	8,339	0.5
383	Vingulch-Rock outcrop complex, 35 to 65 percent slopes	---	5,557	---	---	5,557	0.3
384	Vitrandic Dystrocryepts-Rock outcrop complex, 15 to 35 percent slopes	---	819	---	---	819	*
385	Vitrandic Dystrocryepts-Rock outcrop complex, 35 to 90 percent slopes	---	3,243	---	---	3,243	0.2
386	Vitrandic Eutrocryepts-Cryaquolls complex, 0 to 5 percent slopes	---	1,172	---	---	1,172	*
387	Volmont-Rock outcrop complex, 35 to 65 percent slopes	---	1,589	---	---	1,589	*
388	Wagberg-Lithic Ultic Haploxerolls-Rock outcrop complex, 35 to 90 percent slopes	---	676	---	---	676	*
389	Wagberg-Swakane complex, 15 to 35 percent slopes	---	879	---	---	879	*
390	Wagberg-Swakane-Rock outcrop complex, 35 to 65 percent slopes	---	739	---	---	739	*
391	Wapal ashy sandy loam, 0 to 20 percent slopes	---	1,339	---	---	1,339	*
392	Wapal stony ashy coarse sandy loam, 0 to 15 percent slopes	---	3,294	---	---	3,294	0.2
393	Wapal bouldery ashy sandy loam, 15 to 35 percent slopes	---	986	---	---	986	*
394	Wapal very stony ashy coarse sandy loam, 15 to 35 percent slopes	---	4,594	---	---	4,594	0.3
395	Wapal very stony ashy coarse sandy loam, 35 to 65 percent slopes	---	3,167	---	---	3,167	0.2
396	Wapal very stony ashy coarse sandy loam, dry, 35 to 65 percent slopes	---	4,718	---	---	4,718	0.3
397	Wapal-Brevco complex, 15 to 35 percent slopes	---	3,704	---	---	3,704	0.2
398	Wapal-Brevco complex, 35 to 65 percent slopes	---	12,170	---	---	12,170	0.7
399	Wapal-Rock outcrop complex, 35 to 65 percent slopes	---	8,443	---	---	8,443	0.5
400	Wapal-Sacheen complex, 35 to 65 percent slopes	---	1,543	---	---	1,543	*
401	Water	69	648	---	55	772	*
402	Wellsfar-Dodd-Rock outcrop complex, 15 to 35 percent slopes	---	2,663	---	---	2,663	0.2
403	Wellsfar-Sitdown complex, 15 to 35 percent slopes	---	2,392	---	---	2,392	0.1
404	Wellsfar-Sitdown complex, 35 to 65 percent slopes	---	2,252	---	---	2,252	0.1
405	Wenner ashy loam, 15 to 35 percent slopes	---	525	---	---	525	*

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Chelan County	Okanogan County	Skagit County	Whatcom County	Total	
						Area	Extent
		Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Pct*
406	Wenner ashy loam, 35 to 65 percent slopes	---	258	---	---	258	*
407	Wilder-Republic complex, 35 to 65 percent slopes	---	494	---	---	494	*
408	Wilma-Lithic Haploxerepts-Rock outcrop complex, 15 to 35 percent slopes	---	1,521	---	---	1,521	*
409	Wilma-Lithic Haploxerepts-Rock outcrop complex, 35 to 65 percent slopes	---	2,400	---	---	2,400	0.1
410	Wilma-Rock outcrop complex, 35 to 65 percent slopes	---	1,461	---	---	1,461	*
411	Winsand-Verhart complex, 35 to 65 percent slopes	---	3,622	---	---	3,622	0.2
412	Winthrop stony loamy sand, 0 to 45 percent slopes	---	70	---	---	70	*
413	Wocreek-Coopmont complex, 15 to 35 percent slopes	---	3,776	---	---	3,776	0.2
414	Wynhoff gravelly sandy loam, 35 to 65 percent slopes	---	789	---	---	789	*
415	Wynhoff-Lithic Haploxerepts-Rock outcrop complex, 15 to 35 percent slopes	---	235	---	---	235	*
416	Yellcreek-Midpeak-Rock outcrop complex, 35 to 65 percent slopes	---	3,213	---	---	3,213	0.2
700	Andic Eutrocryepts-Lithic Vitricryands complex, 15 to 35 percent slopes	---	16,811	---	---	16,811	1.0
701	Andic Eutrocryepts-Xeric Vitricryands-Rock outcrop complex, 20 to 50 percent slopes	---	29,118	---	---	29,118	1.7
702	Andic Haplocryods-Typic Vitricryands complex, cirque basin, 10 to 50 percent slopes	---	20,600	---	1,366	21,966	1.3
703	Cryaquepts-Aquic Dystrocryepts complex, 0 to 25 percent slopes	---	6,990	---	196	7,186	0.4
704	Humic Dystrocryepts-Humic Vitricryands complex, 35 to 75 percent slopes	26	31,918	---	4,823	36,767	2.2
705	Humic Vitricryands-Humic Dystrocryepts complex, 15 to 35 percent slopes	---	14,244	---	429	14,673	0.9
706	Lithic Dystrocryepts-Rock outcrop-Chutes, avalanche, complex, 35 to 100 percent slopes	---	84,886	---	17,863	102,749	6.0
707	Lithic Eutrocryepts-Andic Eutrocryepts complex, 10 to 70 percent slopes	---	23,134	---	10,891	34,025	2.0
708	Typic Udivitrands-Andic Dystrudepts complex, till substratum, 35 to 75 percent slopes	---	751	---	24,171	24,922	1.5
709	Typic Vitricryands-Andic Dystrocryepts-Rock outcrop complex, 20 to 50 percent slopes	---	69,713	---	18,931	88,644	5.2
710	Typic Vitricryands-Andic Haplocryods complex, till substratum, 25 to 75 percent slopes	---	93,457	---	27,607	121,064	7.1
711	Typic Vitrixerands-Andic Haploxerepts complex, till substratum, 15 to 65 percent slopes	---	12,216	---	---	12,216	0.7
712	Vitrandic Dystrocryepts-Lithic Dystrocryepts complex, 35 to 70 percent slopes	459	11,500	---	1,001	12,960	0.8
713	Vitrandic Haploxerepts-Typic Vitrixerands-Rock outcrop complex, 30 to 60 percent slopes	---	13,799	---	---	13,799	0.8
714	Xeric Vitricryands-Andic Eutrocryepts complex, till substratum, 5 to 35 percent slopes	---	12,220	---	154	12,374	0.7
900	Andic Dystrocryepts-Andic Haplocryods-Cryofluvents association, till substratum, 0 to 35 percent slopes	---	5,992	4,581	1,020	11,593	0.7
901	Andic Dystrocryepts-Typic Vitricryands association, till substratum, 35 to 75 percent slopes	---	889	1,756	205	2,850	0.2

See footnote at end of table.

Table 4.--Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Chelan County	Okanogan County	Skagit County	Whatcom County	Total	
						Area	Extent
		Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Pct*
902	Andic Dystrocryepts-Vitrandic Dystrocryepts-Rock outcrop association, 60 to 90 percent slopes	---	3,932	391	3,885	8,208	0.5
903	Andic Dystrudepts-Typic Udivitrands-Rock outcrop association, 35 to 75 percent slopes	---	---	836	10,130	10,966	0.6
904	Andic Haplocryods-Rock outcrop association, 15 to 35 percent slopes	---	1,100	105	54	1,259	*
905	Andic Haplocryods-Rock outcrop association, 35 to 65 percent slopes	420	5,933	644	1,537	8,534	0.5
906	Andic Haplocryods-Typic Vitricryands association, 35 to 65 percent slopes	814	3,381	4,397	5,246	13,838	0.8
907	Andic Haplocryods-Typic Vitricryands, till substratum, complex, 5 to 25 percent slopes	1,603	23,664	934	1,497	27,698	1.6
908	Andic Haplocryods-Vitrandic Dystrocryepts-Rock outcrop association, 15 to 35 percent slopes	---	676	289	117	1,082	*
909	Andic Haplocryods-Vitrandic Dystrocryepts-Rock outcrop association, 35 to 90 percent slopes	392	2,141	2,460	1,428	6,421	0.4
910	Rock outcrop-Andic Dystrocryepts association, 35 to 90 percent slopes	---	1,515	---	---	1,515	*
911	Rock outcrop-Andic Dystrocryepts-Chutes, avalanche, association, 60 to 90 percent slopes	---	2,945	4	2,768	5,717	0.3
912	Rock outcrop-Lithic Haploxerepts-Vitrandic Haploxerepts association, 35 to 75 percent slopes	---	6,481	---	---	6,481	0.4
913	Rock outcrop-Lithic Vitricryands association, 60 to 90 percent slopes	795	8,405	3,180	373	12,753	0.7
914	Rock outcrop-Rubble land-Glaciers, snow fields, association, 15 to 100 percent slopes	1,393	42,400	3,395	1,983	49,171	2.9
915	Rock outcrop-Vitrandic Dystrocryepts association, 35 to 90 percent slopes	258	1,004	1,007	434	2,703	0.2
916	Rock outcrop-Vitrandic Dystrudepts association, 60 to 90 percent slopes	---	---	---	1,277	1,277	*
917	Typic Udivitrands-Andic Dystrudepts association, 35 to 65 percent slopes	---	---	586	5,378	5,964	0.3
918	Typic Udivitrands-Andic Dystrudepts association, 65 to 90 percent slopes	---	---	---	2,610	2,610	0.2
919	Typic Vitricryands, 5 to 35 percent slopes	---	1,179	---	355	1,534	*
920	Typic Vitricryands-Andic Haplocryods-Fulvicryands association, 35 to 90 percent slopes	947	9,164	5,813	7,826	23,750	1.4
921	Typic Vitricryands-Rock outcrop association, 35 to 75 percent slopes	193	915	668	---	1,776	0.1
922	Typic Vitrixerands-Andic Haploxerepts-Rock outcrop association, 35 to 75 percent slopes	---	2,128	---	---	2,128	0.1
923	Vitrandic Dystrocryepts, 5 to 35 percent slopes	---	96	---	515	611	*
924	Vitrandic Haploxerepts, 15 to 35 percent slopes	---	558	---	---	558	*
925	Vitrandic Haploxerepts, 35 to 75 percent slopes	---	1,862	---	---	1,862	0.1
926	Vitrandic Haploxerepts-Rock outcrop association, 35 to 65 percent slopes	---	3,833	---	---	3,833	0.2
927	Xeric Vitricryands-Andic Eutrocryepts-Rock outcrop association, 35 to 75 percent slopes	---	4,931	---	---	4,931	0.3
	Total	9,013	1,501,470	35,200	161,971	1,707,654	100.0

* Less than 0.1 percent.

100—Aits ashy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,500 to 4,000 feet
Mean annual precipitation: 22 to 35 inches
Mean annual air temperature: 41 to 43 degrees F
Frost-free period: 90 to 110 days

Map Unit Composition

Aits and similar soils: 100 percent

Aits and Similar Soils

Setting
Landform: Mountains and foothills
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Center and lower thirds of mountainflanks
Aspect, representative: West
Aspect, range: South to northwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/ninebark (CDS715)

Typical profile
A—0 to 2 inches; ashy loam
Bw1—2 to 12 inches; ashy loam
2Bw2—12 to 17 inches; gravelly loam
2Bw3—17 to 34 inches; gravelly loam
2Bw4—34 to 45 inches; gravelly loam
2Bw5—45 to 60 inches; very gravelly clay loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

101—Andic Dystrocryepts-Aquic Dystrocryepts complex, 0 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains and 43A—Northern Rocky Mountains
Elevation: 4,600 to 5,700 feet

Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 80 days

Map Unit Composition

Andic Dystrocryepts, udic, forested, and similar soils: 60 percent
Aquic Dystrocryepts, udic, forested, and similar soils: 25 percent
Unnamed dissimilar minor components: 15 percent

Andic Dystrocryepts, Udic, Forested, and Similar Soils

Setting
Landform: Glacial-trough mountain valleys
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Lower third of mountainflanks
Aspect, representative: Northwest
Aspect, range: Southwest to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/Cascade azalea (CES214)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; ashy fine sandy loam
2Bw—4 to 10 inches; ashy fine sandy loam
3C1—10 to 21 inches; cobbly sandy loam
3C2—21 to 60 inches; gravelly loamy sand

Aquic Dystrocryepts, Udic, Forested, and Similar Soils

Setting
Landform: Depressions in mountains, depressions in bottoms of drainageways, depressions in glacial-trough valleys
Geomorphic position, two-dimensional: Footslopes and toeslopes
Geomorphic position, three-dimensional: Mountainbases and dips
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (7 to 11 inches) over glacial till and alluvium
Slope: 0 to 15 percent
Depth to restrictive feature: 20 to 60 inches to dense material
Drainage class: Poorly drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None

Seasonal high water table, minimum depth: About 18 to 34 inches (See Water Features table.)
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6w
Plant community classification: Subalpine fir series, wetland (CEW0)

Typical profile
A—0 to 6 inches; ashy fine sandy loam
AB—6 to 11 inches; ashy sandy loam
2Bw1—11 to 28 inches; gravelly sandy loam
2Bw2—28 to 34 inches; very gravelly sandy loam
2Cd—34 to 60 inches; very gravelly sandy loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

102—Andic Dystrocryepts-Rock outcrop-Rubble land complex, 35 to 90 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 6,600 to 7,800 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Andic Dystrocryepts, udic, forested, and similar soils: 55 percent
Rock outcrop: 25 percent
Rubble land: 20 percent

Andic Dystrocryepts, Udic, Forested, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Aspect, representative: Northeast
Aspect, range: West to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 35 to 90 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/Cascade azalea (CES214)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; ashy fine sandy loam
2Bw—4 to 10 inches; ashy fine sandy loam
3C1—10 to 21 inches; cobbly sandy loam
3C2—21 to 60 inches; gravelly loamy sand

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 90 percent. The land capability classification is 8.

Rubble Land

Rubble land consists of colluvial deposits of gravel, cobbles, stones, and boulders. Voids between the fragments contain little or no soil material. Slopes range from 35 to 90 percent. Rubble land is typically underlain by bedrock at a depth of more than 40 inches. The land capability classification is 8.

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

103—Andic Dystrocryepts-Vitrandic Dystrocryepts complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 6,200 to 7,500 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Andic Dystrocryepts, udic, forested, and similar soils: 55 percent
Vitrandic Dystrocryepts, udic, nonforested, and similar soils: 30 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Andic Dystrocryepts, Udic, Forested, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 15 to 35 percent

Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/Cascade azalea/smooth woodrush (CES213)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; ashy fine sandy loam
2Bw—4 to 10 inches; ashy fine sandy loam
3C1—10 to 21 inches; cobbly sandy loam
3C2—21 to 60 inches; gravelly loamy sand

Vitrandic Dystrocryepts, Udic, Nonforested, and Similar Soils

Setting
Landform: Basins and headwalls of cirques on mountains
Geomorphic position, two-dimensional: Summits, shoulders, and backslopes
Geomorphic position, three-dimensional: Mountaintops and mountainflanks
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 25 inches) over colluvium and residuum from mixed rock sources
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Ecological site: Subalpine Park (R006XY704WA)

Typical profile
A1—0 to 4 inches; stony ashy fine sandy loam
A2—4 to 12 inches; gravelly ashy sandy loam
Bw—12 to 20 inches; very gravelly ashy sandy loam
2C—20 to 31 inches; extremely gravelly sandy loam
2R—31 to 35 inches; unweathered bedrock

Named Dissimilar Minor Components

Rock outcrop
Composition: 5 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

104—Andic Dystrocryepts-Vitrandic Dystrocryepts complex, 35 to 90 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 6,500 to 7,500 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Andic Dystrocryepts, udic, forested, and similar soils: 55 percent
Vitrandic Dystrocryepts, udic, nonforested, and similar soils: 30 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Andic Dystrocryepts, Udic, Forested, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 35 to 90 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/Cascade azalea/smooth woodrush (CES213)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; ashy fine sandy loam
2Bw—4 to 10 inches; ashy fine sandy loam
3C1—10 to 21 inches; cobbly sandy loam
3C2—21 to 60 inches; gravelly loamy sand

Vitrandic Dystrocryepts, Udic, Nonforested, and Similar Soils

Setting
Landform: Avalanche chutes on mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits

Geomorphic position, three-dimensional: Mountainflanks, mountainbases, and mountaintops
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 25 inches) over colluvium and residuum from mixed rock sources
Slope: 35 to 90 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Ecological site: Subalpine Park (R006XY704WA)

Typical profile
A1—0 to 4 inches; stony ashy fine sandy loam
A2—4 to 12 inches; gravelly ashy sandy loam
Bw—12 to 20 inches; very gravelly ashy sandy loam
2C—20 to 31 inches; extremely gravelly sandy loam
2R—31 to 35 inches; unweathered bedrock

Named Dissimilar Minor Components

Rock outcrop
Composition: 5 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

105—Andic Eutrocryepts-Cryaquolls complex, 0 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 4,400 to 5,100 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Andic Eutrocryepts, xeric, forested, till substratum, and similar soils: 65 percent
Cryaquolls, poorly drained, till substratum, and similar soils: 25 percent
Unnamed dissimilar minor components: 10 percent

Andic Eutrocryepts, Xeric, Forested, Till Substratum, and Similar Soils

Setting
Landform: Mountains and glacial-trough valleys
Geomorphic position, two-dimensional: Backslopes and shoulders

Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: North
Aspect, range: North to northwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 5 to 35 percent
Depth to restrictive feature: 20 to 81 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry–twinflower group, Eastern Washington (PCES3F2)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; ashy fine sandy loam
2Bw—4 to 10 inches; ashy fine sandy loam
3C1—10 to 21 inches; cobbly sandy loam
3C2—21 to 60 inches; gravelly loamy sand

Cryaquolls, Poorly Drained, Till Substratum, and Similar Soils

Setting
Landform: Drainageways in depressional areas on outwash plains on mountains; drainageways in depressional areas on outwash terraces on mountains
Geomorphic position, two-dimensional: Toeslopes
Geomorphic position, three-dimensional: Mountainbases, treads, and dips
Down-slope shape: Concave
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed alluvium over glacial till and glacial outwash
Slope: 0 to 5 percent
Depth to restrictive feature: 19 to 40 inches to strongly contrasting textural stratification
Drainage class: Poorly drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: Occasional (See Water Features table.)
Frequency of ponding: Rare (See Water Features table.)
Seasonal high water table, minimum depth: About 12 to 20 inches (See Water Features table.)
Available water capacity, entire profile: Low (about 5.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 6w
Plant community classification: Engelmann spruce series, wetland (CEM0)

Typical profile
A1—0 to 7 inches; loam
A2—7 to 15 inches; loam
Bg—15 to 19 inches; silt loam
2Cg1—19 to 29 inches; sandy loam

2Cg2—29 to 38 inches; gravelly loamy coarse sand
2Cg3—38 to 60 inches; gravelly fine sandy loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

106—Anglen ashy loam, 0 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,600 to 4,000 feet
Mean annual precipitation: 17 to 30 inches
Mean annual air temperature: 41 to 43 degrees F
Frost-free period: 90 to 130 days

Map Unit Composition

Anglen and similar soils: 100 percent

Anglen and Similar Soils

Setting
Landform: Glacial lake terraces
Geomorphic position, three-dimensional: Treads
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial lake sediments
Slope: 0 to 15 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Moderately well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: About 30 to 42 inches (See Water Features table.)
Available water capacity, entire profile: High (about 10.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 3e
Land capability classification, irrigated: 3e
Plant community classification: Douglas-fir/ninebark/twinflower (CDS716)

Typical profile
Bw—0 to 6 inches; ashy loam
C—6 to 14 inches; ashy silt loam
2Bt1—14 to 29 inches; silty clay
2Bt2—29 to 43 inches; silty clay
2C1—43 to 52 inches; stratified silt loam to clay
2C2—52 to 60 inches; stratified silt loam to clay

107—Anglen ashy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,600 to 4,000 feet

Mean annual precipitation: 17 to 30 inches
Mean annual air temperature: 41 to 43 degrees F
Frost-free period: 90 to 130 days

Map Unit Composition

Anglen and similar soils: 100 percent

Anglen and Similar Soils

Setting
Landform: Glacial lake terraces
Geomorphic position, three-dimensional: Risers
Aspect, representative: East
Aspect, range: North to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial lake sediments
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Moderately well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: About 30 to 42 inches (See Water Features table.)
Available water capacity, entire profile: High (about 10.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 3e
Land capability classification, irrigated: 3e
Plant community classification: Douglas-fir/ninebark/twinflower (CDS716)

Typical profile
Bw—0 to 6 inches; ashy loam
C—6 to 14 inches; ashy loam
2Bt1—14 to 29 inches; silty clay
2Bt2—29 to 43 inches; silty clay
2C1—43 to 52 inches; stratified silt loam to clay
2C2—52 to 60 inches; stratified silt loam to clay

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

108—Aquandic Cryaquepts, 0 to 3 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,500 to 6,000 feet
Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 80 to 100 days

Map Unit Composition

Aquandic Cryaquepts and similar soils: 100 percent

Aquandic Cryaquepts and Similar Soils

Setting
Landform: Depressions in mountains
Geomorphic position, two-dimensional: Toeslopes
Geomorphic position, three-dimensional: Mountainbases
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over alluvium
Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 60 inches to strongly contrasting textural stratification
Drainage class: Poorly drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: About 0 to 9 inches (See Water Features table.)
Available water capacity, entire profile: Moderate (about 6.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 6w
Plant community classification: Subalpine fir series, wetland (CEW0)

Typical profile
A—0 to 9 inches; ashy silt loam
2Ab—9 to 17 inches; fine sandy loam
2Bg—17 to 22 inches; gravelly sandy loam
2C1—22 to 28 inches; stratified fine sandy loam to extremely gravelly sand
2C2—28 to 60 inches; stratified fine sandy loam to extremely gravelly sand

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

109—Aquandic Endoaquolls, 0 to 5 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 2,900 to 4,200 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 80 to 100 days

Map Unit Composition

Aquandic Endoaquolls and similar soils: 90 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 5 percent

Aquandic Endoaquolls and Similar Soils

Setting
Landform: Bottoms of drainageways on bottoms of basin floors; bottoms of drainageways on bottoms of valley floors
Geomorphic position, two-dimensional: Toeslopes

Geomorphic position, three-dimensional: Dips, rises, and talfs
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over alluvium or glacial till
Slope: 0 to 5 percent
Depth to restrictive feature: 8 to 20 inches to strongly contrasting textural stratification
Drainage class: Very poorly drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: Occasional (See Water Features table.)
Frequency of ponding: Occasional (See Water Features table.)
Seasonal high water table, minimum depth: About 0 to 6 inches (See Water Features table.)
Available water capacity, entire profile: Moderate (about 7.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 6w
Plant community classification: Quaking aspen series, wetland (HQM0)

Typical profile
Oe—0 to 4 inches; mucky peat
A1—4 to 11 inches; ashy silt loam
2A2—11 to 18 inches; silt loam
2A3—18 to 23 inches; silt loam
2Cg1—23 to 39 inches; fine sandy loam
3Cg2—39 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Haplosaprists
Composition: 5 percent
Landform: Bottoms of drainageways in valleys on mountains; bottoms of basin floors in valleys on mountains
Geomorphic position, two-dimensional: Toeslopes
Geomorphic position, three-dimensional: Mountainbases

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

110—Aquandic Endoaquolls-Haplosaprists complex, 0 to 10 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,800 to 5,000 feet
Mean annual precipitation: 18 to 25 inches
Mean annual air temperature: 39 to 44 degrees F
Frost-free period: 80 to 100 days

Map Unit Composition

Aquandic Endoaquolls and similar soils: 65 percent
Haplosaprists and similar soils: 25 percent
Unnamed dissimilar minor components: 10 percent

Aquandic Endoaquolls and Similar Soils

Setting

Landform: Bottoms of drainageways on bottoms of basin floors; bottoms of drainageways on bottoms of valley floors
Geomorphic position, two-dimensional: Toeslopes
Geomorphic position, three-dimensional: Dips, rises, and talfs
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities

Parent material: Volcanic ash (7 to 14 inches) over alluvium or glacial till
Slope: 0 to 10 percent
Depth to restrictive feature: 24 to 50 inches to strongly contrasting textural stratification
Drainage class: Very poorly drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: Occasional (See Water Features table.)
Frequency of ponding: Occasional (See Water Features table.)
Seasonal high water table, minimum depth: About 0 to 6 inches (See Water Features table.)
Available water capacity, entire profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification, nonirrigated: 6w
Plant community classification: Willow series, wetland (SW10)

Typical profile

Oe—0 to 4 inches; mucky peat
A1—4 to 11 inches; ashy silt loam
2A2—11 to 18 inches; silt loam
2A3—18 to 23 inches; silt loam
2Cg1—23 to 39 inches; fine sandy loam
3Cg2—39 to 60 inches; very gravelly sandy loam

Haplosaprists and Similar Soils

Setting

Landform: Depressions in glacial terraces, depressions in till plains, mountains, and valleys
Geomorphic position, two-dimensional: Toeslopes
Geomorphic position, three-dimensional: Mountainbases, treads, and dips
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities

Parent material: Organic soil material over alluvium or glaciolacustrine deposits
Slope: 0 to 5 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Very poorly drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: Occasional (See Water Features table.)
Frequency of ponding: Frequent (See Water Features table.)
Seasonal high water table, minimum depth: At the soil surface (See Water Features table.)
Available water capacity, entire profile: Very high (about 17.1 inches)

Interpretive groups

Land capability classification, nonirrigated: 6w
Ecological site: Subalpine Wet Shrub Meadow (R006XY604WA)

Plant community classification: Sedge plant associations (meadow series), wetland (MW)

Typical profile
Oe—0 to 8 inches; mucky peat
Oa—8 to 18 inches; muck
A—18 to 34 inches; silt loam
Cg1—34 to 44 inches; silt loam
Cg2—44 to 55 inches; fine sandy loam
O´a—55 to 60 inches; muck

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

111—Aquandic Xerofluvents, 0 to 5 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 2,100 to 2,600 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Aquandic Xerofluvents and similar soils: 85 percent
Named dissimilar minor components: 7 percent
Unnamed dissimilar minor components: 8 percent

Aquandic Xerofluvents and Similar Soils

Setting
Landform: Low stream terraces, flood plains, and bottoms of drainageways
Geomorphic position, three-dimensional: Mountainbases, talfs, rises, and dips
Down-slope shape: Concave
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over alluvium
Slope: 0 to 5 percent
Depth to restrictive feature: 40 to 60 inches to strongly contrasting textural stratification
Drainage class: Somewhat poorly drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: Occasional (See Water Features table.)
Frequency of ponding: None
Seasonal high water table, minimum depth: About 24 to 48 inches (See Water Features table.)
Available water capacity, entire profile: Moderate (about 6.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 3w
Plant community classification: Douglas-fir/common snowberry, flood plain, riparian (CDS628)

Typical profile
A—0 to 4 inches; ashy sandy loam
C—4 to 8 inches; ashy sandy loam
Ab—8 to 13 inches; ashy sandy loam
2C1—13 to 24 inches; stratified gravelly coarse sand to sandy loam
2C2—24 to 44 inches; stratified very gravelly coarse sand to sandy loam
2C3—44 to 50 inches; stratified very gravelly coarse sand to sandy loam
2C4—50 to 60 inches; stratified very gravelly coarse sand to sandy loam

Named Dissimilar Minor Components

Riverwash
Composition: 7 percent
Landform: Flood plains in drainageways

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

112—Aquic Dystrocryepts, 0 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains and 43A—Northern Rocky Mountains
Elevation: 5,400 to 6,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Aquic Dystrocryepts, udic, forested, and similar soils: 85 percent
Unnamed dissimilar minor components: 15 percent

Aquic Dystrocryepts, Udic, Forested, and Similar Soils

Setting
Landform: Bottoms of drainageways on mountains, glacial-trough valleys, bottoms of drainageways in glacial-trough valleys, and depressions
Geomorphic position, two-dimensional: Footslopes and toeslopes
Geomorphic position, three-dimensional: Mountainbases, dips, talfs, and rises
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (7 to 11 inches) over glacial till and alluvium
Slope: 0 to 15 percent
Depth to restrictive feature: 20 to 60 inches to dense material
Drainage class: Somewhat poorly drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: About 18 to 34 inches (See Water Features table.)
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6w
Plant community classification: Subalpine fir series, wetland (CEW0)

Typical profile
A—0 to 6 inches; ashy fine sandy loam
AB—6 to 11 inches; ashy sandy loam
2Bw1—11 to 28 inches; gravelly sandy loam
2Bw2—28 to 34 inches; very gravelly sandy loam
2Cd—34 to 60 inches; very gravelly sandy loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

113—Ashnola gravelly ashy sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 5,000 to 6,200 feet
Mean annual precipitation: 35 to 40 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Ashnola and similar soils: 85 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Ashnola and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks
Aspect, representative: Northeast
Aspect, range: Northwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (12 to 22 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 35 to 50 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/Cascade azalea (CES214)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw1—4 to 9 inches; gravelly ashy sandy loam
Bw2—9 to 16 inches; gravelly ashy sandy loam
2C1—16 to 23 inches; very gravelly sandy loam
2C2—23 to 38 inches; very gravelly sandy loam
2Cd—38 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Gatewall soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

114—Ashnola gravelly ashy sandy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 5,200 to 6,500 feet
Mean annual precipitation: 35 to 40 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Ashnola and similar soils: 85 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Ashnola and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks
Aspect, representative: Northeast
Aspect, range: North to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (12 to 22 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 35 to 50 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/Cascade azalea (CES214)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw1—4 to 9 inches; gravelly ashy sandy loam
Bw2—9 to 16 inches; gravelly ashy sandy loam
2C1—16 to 23 inches; very gravelly sandy loam
2C2—23 to 38 inches; very gravelly sandy loam
2Cd—38 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Gatewall soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Verhart soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

115—Baldknob-Rock outcrop complex, 35 to 90 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 2,500 to 4,300 feet
Mean annual precipitation: 15 to 20 inches
Mean annual air temperature: 44 to 50 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Baldknob and similar soils: 55 percent
Rock outcrop: 30 percent
Unnamed dissimilar minor components: 15 percent

Baldknob and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Colluvium and residuum derived from volcanic rocks

Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Dry Stony 15+ P.Z. (R006XY201WA)

Typical profile
A—0 to 3 inches; gravelly ashy loam
Bw—3 to 12 inches; very flaggy loam
R—12 to 16 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 90 percent. The land capability classification is 8.

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

116—Baldknob-Thout-Nicmar complex, 15 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,500 to 4,400 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 40 to 50 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Baldknob and similar soils: 40 percent
Thout, cool, and similar soils: 25 percent
Nicmar and similar soils: 20 percent
Named dissimilar minor components: 15 percent

Baldknob and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Colluvium and residuum derived from volcanic rocks
Slope: 15 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained

Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Dry Stony 15+ P.Z. (R006XY201WA)

Typical profile
A—0 to 3 inches; gravelly ashy loam
Bw—3 to 12 inches; very flaggy loam
R—12 to 16 inches; unweathered bedrock

Thout, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium and residuum from volcanic and sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/mountain snowberry (CDS632 and CDS629)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
2Bw1—4 to 11 inches; very gravelly ashy sandy loam
2Bw2—11 to 24 inches; very gravelly ashy sandy loam
2R—24 to 28 inches; unweathered bedrock

Nicmar and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 25 inches) over glacial till from volcanic and sedimentary rock

Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 8.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/ninebark (CDS715)

Typical profile
A—0 to 4 inches; ashy loam
Bw—4 to 16 inches; gravelly ashy loam
2Bt1—16 to 23 inches; very cobbly clay loam
2Bt2—23 to 33 inches; very cobbly clay loam
2BC—33 to 60 inches; very gravelly sandy clay loam

Named Dissimilar Minor Components

Borgeau soils
Composition: 7 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Rock outcrop
Composition: 5 percent

Scoap soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production (Thout and Nicmar soils), recreation, watershed, and wildlife habitat

117—Bearspring gravelly ashy sandy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,800 to 4,300 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Bearspring and similar soils: 85 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Bearspring and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 15 inches) over colluvium derived from granite
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/mountain snowberry (CDS632 and CDS629)

Typical profile
A1—0 to 7 inches; gravelly ashy sandy loam
A2—7 to 12 inches; gravelly ashy sandy loam
2Bw—12 to 19 inches; gravelly sandy loam
2C1—19 to 36 inches; very gravelly sandy loam
2C2—36 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Mineral soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Newhorn soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

118—Bluebuck stony ashy sandy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,600 to 6,200 feet

Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Bluebuck and similar soils: 80 percent
Named dissimilar minor components: 12 percent
Unnamed dissimilar minor components: 8 percent

Bluebuck and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Down-slope shape: Concave
Aspect, representative: North
Aspect, range: Southwest to southeast (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial till and glacial outwash from granitic rock
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification; 40 to 60 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
C—0 to 1 inch; ashy fine sandy loam
2A—1 to 3 inches; stony ashy sandy loam
2Bw—3 to 11 inches; gravelly ashy sandy loam
3CB—11 to 24 inches; very gravelly loamy sand
4C1—24 to 35 inches; extremely gravelly coarse sand
5C2—35 to 54 inches; very gravelly loamy sand
5Cd—54 to 60 inches; very gravelly loamy sand

Named Dissimilar Minor Components

Devore soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Myerscreek soils
Composition: 5 percent
Landform: Glacial moraines on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainflanks

Sitdown soils
Composition: 2 percent
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, risers, and treads

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

119—Boesel fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 1,500 to 3,200 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Boesel and similar soils: 95 percent
Unnamed dissimilar minor components: 5 percent

Boesel and Similar Soils

Setting
Landform: Stream terraces
Geomorphic position, three-dimensional: Treads
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Alluvium
Slope: 0 to 3 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Drainage class: Moderately well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: Occasional (See Water Features table.)
Frequency of ponding: None
Seasonal high water table, minimum depth: About 36 to 48 inches (See Water Features table.)
Available water capacity, entire profile: Low (about 5.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 3w
Land capability classification, irrigated: 3w
Plant community classification: Ponderosa pine/pinegrass-bluebunch wheatgrass (CPG231)

Typical profile
A—0 to 8 inches; fine sandy loam
AC—8 to 27 inches; fine sandy loam
2C1—27 to 37 inches; loamy sand
2C2—37 to 60 inches; very gravelly coarse sand

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

120—Bong ashy sandy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,100 to 3,000 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Bong and similar soils: 85 percent
Named dissimilar minor components: 15 percent

Bong and Similar Soils

Setting
Landform: Glacial outwash terraces
Geomorphic position, three-dimensional: Risers
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 16 inches) over glacial outwash
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Plant community classification: Ponderosa pine/bitterbrush/bluebunch wheatgrass (CPS241)

Typical profile
A1—0 to 6 inches; ashy sandy loam
A2—6 to 10 inches; ashy sandy loam
Bw—10 to 16 inches; gravelly ashy sandy loam
2C1—16 to 26 inches; gravelly loamy coarse sand
2C2—26 to 60 inches; gravelly coarse sand

Named Dissimilar Minor Components

Donovan soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Upper third of mountainflanks

Rock outcrop
Composition: 5 percent

Springdale soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

121—Borgeau-Johntom-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,500 to 4,000 feet
Mean annual precipitation: 15 to 20 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 110 to 140 days

Map Unit Composition

Borgeau and similar soils: 55 percent
Johntom and similar soils: 25 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 10 percent

Borgeau and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial till and colluvium from volcanic rock
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Ecological site: Cool Stony 15+ P.Z. (R006XY203WA)

Typical profile
A1—0 to 5 inches; ashy loam
A2—5 to 14 inches; gravelly ashy loam
2Bw—14 to 27 inches; very gravelly loam

2BC—27 to 41 inches; very gravelly loam
2C—41 to 60 inches; very gravelly sandy loam

Johntom and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Colluvium and residuum from mixed volcanic and sedimentary rocks
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 3 inches; gravelly loam
A2—3 to 12 inches; very flaggy loam
R—12 to 16 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Baldknob soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Thout soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

122—Borgeau-Nicmar-Johntom complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains

Elevation: 2,500 to 3,700 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 42 to 50 degrees F
Frost-free period: 90 to 140 days

Map Unit Composition

Borgeau, south slopes, and similar soils: 40 percent
Nicmar, north slopes, and similar soils: 30 percent
Johntom, south slopes, and similar soils: 15 percent
Named dissimilar minor components: 15 percent

Borgeau, South Slopes, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial till and colluvium from volcanic rock
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Ecological site: Cool Stony 15+ P.Z. (R006XY203WA)

Typical profile
A1—0 to 5 inches; ashy loam
A2—5 to 14 inches; gravelly ashy loam
2Bw—14 to 27 inches; very gravelly loam
2BC—27 to 41 inches; very gravelly loam
2C—41 to 60 inches; very gravelly sandy loam

Nicmar, North Slopes, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 25 inches) over glacial till from volcanic and sedimentary rock
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained

Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 8.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/ninebark (CDS715)

Typical profile
A—0 to 4 inches; ashy loam
Bw—4 to 16 inches; gravelly ashy loam
2Bt1—16 to 23 inches; very cobbly clay loam
2Bt2—23 to 33 inches; very cobbly clay loam
2BC—33 to 60 inches; very gravelly sandy clay loam

Johntom, South Slopes, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Colluvium and residuum from mixed volcanic and sedimentary rocks
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 3 inches; gravelly loam
A2—3 to 12 inches; very flaggy loam
R—12 to 16 inches; unweathered bedrock

Named Dissimilar Minor Components

Baldknob soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Scoap soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Thout soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

123—Brevco-Lithic Haploxerepts-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,600 to 5,300 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 85 to 115 days

Map Unit Composition

Brevco, cool, and similar soils: 55 percent
Lithic Haploxerepts, forested, moist, and similar soils: 25 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 2 percent
Unnamed dissimilar minor components: 8 percent

Brevco, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 14 inches) over colluvium and residuum from granitic rocks
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/low huckleberry (CDS832)

Typical profile
A—0 to 3 inches; stony ashy coarse sandy loam
Bw—3 to 11 inches; gravelly ashy coarse sandy loam
2C1—11 to 25 inches; very gravelly sandy loam
2C2—25 to 38 inches; very cobbly coarse sandy loam
2R—38 to 48 inches; unweathered bedrock

Lithic Haploxerepts, Forested, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over bedrock
Slope: 15 to 35 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 3 inches; very stony ashy sandy loam
Bw—3 to 12 inches; cobbly ashy sandy loam
2C—12 to 18 inches; very gravelly sandy loam
2R—18 to 22 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Merkel soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

124—Brevco-Lithic Haploxerepts-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,000 to 5,000 feet
Mean annual precipitation: 20 to 24 inches

Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Brevco and similar soils: 45 percent
Lithic Haploxerepts, forested, moist, and similar soils: 30 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Brevco and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: South
Aspect, range: North to northwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 14 inches) over colluvium and residuum from granitic rocks
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 3 inches; stony ashy coarse sandy loam
Bw—3 to 11 inches; gravelly ashy coarse sandy loam
2C1—11 to 25 inches; very gravelly sandy loam
2C2—25 to 38 inches; very cobbly coarse sandy loam
2R—38 to 48 inches; unweathered bedrock

Lithic Haploxerepts, Forested, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: North to northwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over bedrock
Slope: 35 to 65 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None

Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 3 inches; cobbly ashy sandy loam
Bw—3 to 12 inches; cobbly ashy sandy loam
2C—12 to 18 inches; very gravelly sandy loam
2R—18 to 22 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Merkel soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

125—Brevco-Lithic Haploxerepts-Rock outcrop complex, dry, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,000 to 4,900 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Brevco, dry, and similar soils: 55 percent
Lithic Haploxerepts, forested, dry, and similar soils: 25 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 5 percent

Brevco, Dry, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: North to northwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 14 inches) over colluvium and residuum from granitic rocks
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/bitterbrush/bluebunch wheatgrass (CDS674)

Typical profile
A—0 to 3 inches; stony ashy coarse sandy loam
Bw—3 to 11 inches; gravelly ashy coarse sandy loam
2C1—11 to 25 inches; very gravelly sandy loam
2C2—25 to 38 inches; very cobbly coarse sandy loam
2R—38 to 48 inches; unweathered bedrock

Lithic Haploxerepts, Forested, Dry, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: North to northwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over bedrock
Slope: 35 to 65 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Plant community classification: Douglas-fir/bitterbrush/pinegrass (CDS675)

Typical profile
A—0 to 3 inches; very stony ashy sandy loam
Bw—3 to 12 inches; cobbly ashy sandy loam
2C—12 to 18 inches; very gravelly sandy loam
2R—18 to 22 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Merkel soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

126—Bromas-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 5,200 to 6,400 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Bromas and similar soils: 60 percent
Rock outcrop: 25 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Bromas and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and backslopes
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: West
Aspect, range: South to north (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum derived from granite and metamorphic rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
A—0 to 4 inches; stony ashy sandy loam
Bw—4 to 12 inches; cobbly ashy sandy loam

2C1—12 to 31 inches; very gravelly loamy sand
3C2—31 to 37 inches; very gravelly sandy loam
3Cr—37 to 47 inches; weathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Myerscreek soils
Composition: 5 percent
Landform: Glacial moraines on mountains
Geomorphic position, two-dimensional: Backslopes, footslopes, and toeslopes
Geomorphic position, three-dimensional: Mountainflanks

Sitdown soils
Composition: 5 percent
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, risers, and treads

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

127—Bromas-Sitdown complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,200 to 5,500 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Bromas, warm, and similar soils: 50 percent
Sitdown and similar soils: 35 percent
Named dissimilar minor components: 15 percent

Bromas, Warm, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: Northwest
Aspect, range: Southwest to north (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum derived from granite and metamorphic rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained

Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES342)

Typical profile
A—0 to 4 inches; ashy sandy loam
Bw—4 to 12 inches; cobbly ashy sandy loam
2C1—12 to 31 inches; very gravelly loamy sand
3C2—31 to 37 inches; very gravelly sandy loam
3Cr—37 to 47 inches; weathered bedrock

Sitdown and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: Northwest
Aspect, range: Southwest to north (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 14 inches) over glacial outwash and glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES342)

Typical profile
A—0 to 3 inches; gravelly ashy sandy loam
Bw—3 to 11 inches; gravelly ashy sandy loam
2C1—11 to 23 inches; extremely cobbly loamy sand
2C2—23 to 60 inches; extremely gravelly loamy sand

Named Dissimilar Minor Components

Lithic Eutrocryepts
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Myerscreek soils
Composition: 5 percent
Landform: Glacial moraines on mountains
Geomorphic position, two-dimensional: Backslopes, footslopes, and toeslopes
Geomorphic position, three-dimensional: Mountainflanks

Rock outcrop
Composition: 5 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

128—Burpeak-Rock outcrop complex, 65 to 90 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,800 to 5,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Burpeak and similar soils: 60 percent
Rock outcrop: 25 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Burpeak and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Northeast
Aspect, range: North to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (20 to 35 inches) over colluvium from volcanic rock
Slope: 65 to 90 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/pachistima/pinegrass (CES112)

Typical profile
A—0 to 4 inches; stony ashy sandy loam
Bw1—4 to 10 inches; very cobbly ashy sandy loam
Bw2—10 to 25 inches; very cobbly ashy sandy loam
Bw3—25 to 32 inches; very cobbly ashy sandy loam
2BC—32 to 45 inches; extremely stony sandy loam
2R—45 to 49 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 65 to 90 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Farway soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Chutes
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Ortellcreek soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, watershed, and wildlife habitat

129—Buttoncreek gravelly ashy fine sandy loam, 5 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,200 to 3,900 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 43 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Buttoncreek and similar soils: 85 percent
Named dissimilar minor components: 8 percent
Unnamed dissimilar minor components: 7 percent

Buttoncreek and Similar Soils

Setting
Landform: Alluvial fans on mountains
Geomorphic position, two-dimensional: Footslopes and toeslopes
Geomorphic position, three-dimensional: Mountainbases
Aspect, representative: Northeast
Aspect, range: North to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 5 to 25 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 6s
Plant community classification: Subalpine fir/blue (big) huckleberry (CES342)

Typical profile
A—0 to 6 inches; gravelly ashy fine sandy loam
Bw—6 to 13 inches; very cobbly ashy fine sandy loam
2C1—13 to 25 inches; extremely cobbly sandy loam
2C2—25 to 32 inches; extremely gravelly sandy loam
3C3—32 to 60 inches; extremely gravelly loamy sand

Named Dissimilar Minor Components

Sitdown soils
Composition: 5 percent
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, risers, and treads

Ortellcreek soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

130—Cassal ashy loam, 5 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 2,700 to 3,900 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Cassal and similar soils: 95 percent
Unnamed dissimilar minor components: 5 percent

Cassal and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes and footslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (12 to 18 inches) over glacial till
Slope: 5 to 25 percent

Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Moderately well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: About 36 to 45 inches (See Water Features table.)
Available water capacity, entire profile: Low (about 5.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/common snowberry (CDS633 and CDS636)

Typical profile
A1—0 to 4 inches; ashy loam
A2—4 to 13 inches; ashy loam
AB—13 to 18 inches; ashy sandy loam
2C1—18 to 35 inches; very gravelly sandy loam
2C2—35 to 46 inches; very gravelly sandy loam
3Cd—46 to 60 inches; very gravelly sandy loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

131—Chewack-Sitdown-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,400 to 6,400 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Chewack and similar soils: 45 percent
Sitdown, cool, and similar soils: 30 percent
Rock outcrop: 10 percent
Unnamed dissimilar minor components: 15 percent

Chewack and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Northwest
Aspect, range: Southwest to north (clockwise)

Properties and qualities
Parent material: Volcanic ash (20 to 35 inches) over glacial till
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None

Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 6.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
A—0 to 3 inches; very stony ashy sandy loam
Bw—3 to 23 inches; very cobbly ashy sandy loam
2C—23 to 60 inches; very cobbly coarse sandy loam

Sitdown, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Northwest
Aspect, range: Southwest to north (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 14 inches) over glacial outwash and glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
A—0 to 3 inches; stony ashy sandy loam
Bw—3 to 11 inches; gravelly ashy sandy loam
2C1—11 to 23 inches; extremely cobbly loamy sand
2C2—23 to 60 inches; extremely gravelly loamy sand

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

132—Chumstick-Mineral-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope

Elevation: 2,800 to 5,100 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 42 to 46 degrees F
Frost-free period: 105 to 130 days

Map Unit Composition

Chumstick and similar soils: 50 percent
Mineral and similar soils: 20 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Chumstick and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 20 inches) over bedrock
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131) and Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 5 inches; very stony ashy sandy loam
Bw—5 to 15 inches; very stony ashy sandy loam
R—15 to 19 inches; unweathered bedrock

Mineral and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium and residuum from granite and metamorphic rock
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained

Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655) and Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 6 inches; stony ashy loam
Bw—6 to 12 inches; very gravelly ashy loam
2C—12 to 23 inches; very stony sandy loam
2R—23 to 27 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Vanbrunt soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Nevine soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Devore soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

133—Chumstick-Mineral-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 2,500 to 5,100 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 42 to 46 degrees F
Frost-free period: 105 to 130 days

Map Unit Composition

Chumstick and similar soils: 50 percent
Mineral and similar soils: 20 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Chumstick and Similar Soils

Setting

Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities

Parent material: Mixed volcanic ash (0 inches to less than 60 percent of soil depth) mixed with colluvium and residuum derived from granitic and metamorphic rocks
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.1 inches)

Interpretive groups

Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655) and Douglas-fir/pinegrass (CDG131)

Typical profile

A—0 to 5 inches; very stony ashy sandy loam
Bw—5 to 15 inches; very stony ashy sandy loam
R—15 to 19 inches; unweathered bedrock

Mineral and Similar Soils

Setting

Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities

Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium and residuum from granite and metamorphic rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131) and Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 6 inches; stony ashy loam
Bw—6 to 12 inches; very gravelly ashy loam
2C—12 to 23 inches; very stony sandy loam
2R—23 to 27 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Devore soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Vanbrunt soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

134—Chumstick-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 2,800 to 5,100 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 42 to 46 degrees F
Frost-free period: 105 to 130 days

Map Unit Composition

Chumstick and similar soils: 50 percent
Rock outcrop: 35 percent
Named dissimilar minor components: 15 percent

Chumstick and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (0 inches to less than 60 percent of soil depth) mixed with colluvium and residuum derived from granitic and metamorphic rocks
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131) and Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 5 inches; very stony ashy sandy loam
Bw—5 to 15 inches; very stony ashy sandy loam
R—15 to 19 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Merkel soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Mineral soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Rubble land
Composition: 5 percent

Use and Management

Major uses: Livestock grazing, limited timber production, recreation, watershed, and wildlife habitat

135—Conconully ashy loam, 0 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 1,500 to 3,000 feet
Mean annual precipitation: 11 to 15 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 110 to 150 days

Map Unit Composition

Conconully and similar soils: 80 percent
Named dissimilar minor components: 15 percent
Unnamed dissimilar minor components: 5 percent

Conconully and Similar Soils

Setting
Landform: Foot hills
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Side slopes
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (10 to 14 inches) over glacial till
Slope: 0 to 8 percent
Depth to restrictive feature: 26 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 2e
Land capability classification, irrigated: 2e
Ecological site: Loamy 15+ P.Z. (R006XY102WA)

Typical profile
A1—0 to 2 inches; ashy loam
A2—2 to 13 inches; stony ashy loam
2Bw1—13 to 21 inches; gravelly fine sandy loam
2Bw2—21 to 33 inches; gravelly sandy loam
2Cd—33 to 60 inches; gravelly sandy loam

Named Dissimilar Minor Components

Newbon soils
Composition: 15 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainflanks

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

136—Conconully ashy loam, 8 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 1,500 to 3,000 feet
Mean annual precipitation: 11 to 15 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 110 to 150 days

Map Unit Composition

Conconully and similar soils: 80 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 15 percent

Conconully and Similar Soils

Setting
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Side slopes
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (10 to 14 inches) over glacial till
Slope: 8 to 15 percent
Depth to restrictive feature: 26 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 3e
Land capability classification, irrigated: 4e
Ecological site: Loamy 15+ P.Z. (R006XY102WA)

Typical profile
A1—0 to 2 inches; ashy loam
A2—2 to 13 inches; stony ashy loam
2Bw1—13 to 21 inches; gravelly fine sandy loam
2Bw2—21 to 33 inches; gravelly sandy loam
2Cd—33 to 60 inches; gravelly sandy loam

Named Dissimilar Minor Components

Newbon soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainflanks

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

137—Conconully ashy loam, 15 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 1,500 to 3,000 feet
Mean annual precipitation: 11 to 15 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 110 to 150 days

Map Unit Composition

Conconully and similar soils: 80 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 15 percent

Conconully and Similar Soils

Setting
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Side slopes
Aspect, representative: Northwest
Aspect, range: South to northeast (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 14 inches) over glacial till
Slope: 15 to 25 percent
Depth to restrictive feature: 26 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Land capability classification, irrigated: 6e
Ecological site: Loamy 15+ P.Z. (R006XY102WA)

Typical profile
A1—0 to 2 inches; ashy loam
A2—2 to 13 inches; stony ashy loam
2Bw1—13 to 21 inches; gravelly fine sandy loam
2Bw2—21 to 33 inches; gravelly sandy loam
2Cd—33 to 60 inches; gravelly sandy loam

Named Dissimilar Minor Components

Newbon soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainflanks

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

138—Conconully gravelly ashy sandy loam, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 1,500 to 3,000 feet
Mean annual precipitation: 11 to 15 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 110 to 150 days

Map Unit Composition

Conconully and similar soils: 90 percent
Unnamed dissimilar minor components: 10 percent

Conconully and Similar Soils

Setting
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Side slopes
Aspect, representative: Northeast
Aspect, range: Northwest to east (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 14 inches) over glacial till
Slope: 3 to 8 percent
Depth to restrictive feature: 26 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 2e
Land capability classification, irrigated: 2e
Ecological site: Loamy 15+ P.Z. (R006XY102WA)

Typical profile
A1—0 to 2 inches; gravelly ashy sandy loam
A2—2 to 13 inches; stony ashy loam
2Bw1—13 to 21 inches; gravelly fine sandy loam
2Bw2—21 to 33 inches; gravelly sandy loam
2Cd—33 to 60 inches; gravelly sandy loam

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

139—Conconully gravelly ashy sandy loam, 8 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 1,500 to 3,000 feet
Mean annual precipitation: 11 to 15 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 110 to 150 days

Map Unit Composition

Conconully and similar soils: 90 percent
Unnamed dissimilar minor components: 10 percent

Conconully and Similar Soils

Setting
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes

Geomorphic position, three-dimensional: Side slopes
Aspect, representative: Southwest
Aspect, range: Southeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 14 inches) over glacial till
Slope: 8 to 25 percent
Depth to restrictive feature: 26 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Land capability classification, irrigated: 6e
Ecological site: Loamy 15+ P.Z. (R006XY102WA)

Typical profile
A1—0 to 2 inches; gravelly ashy sandy loam
A2—2 to 13 inches; stony ashy loam
2Bw1—13 to 21 inches; gravelly fine sandy loam
2Bw2—21 to 33 inches; gravelly sandy loam
2Cd—33 to 60 inches; gravelly sandy loam

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

140—Conconully extremely stony ashy loam, 0 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 8—Columbia Plateau
Elevation: 1,500 to 3,000 feet
Mean annual precipitation: 11 to 15 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 110 to 150 days

Map Unit Composition

Conconully and similar soils: 80 percent
Named dissimilar minor components: 12 percent
Unnamed dissimilar minor components: 8 percent

Conconully and Similar Soils

Setting
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Side slopes
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (10 to 14 inches) over glacial till

Slope: 0 to 25 percent
Depth to restrictive feature: 26 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 6s
Ecological site: Dry Stony 9-12 P.Z., aridic (R008XY201WA)

Typical profile
A1—0 to 2 inches; extremely stony ashy loam
A2—2 to 13 inches; stony ashy loam
2Bw1—13 to 21 inches; gravelly fine sandy loam
2Bw2—21 to 33 inches; gravelly sandy loam
2Cd—33 to 60 inches; gravelly sandy loam

Named Dissimilar Minor Components

Rock outcrop
Composition: 8 percent

Newbon soils
Composition: 4 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainflanks

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

141—Conconully extremely stony ashy loam, 25 to 65 percent north slopes

Map Unit Setting

Major land resource area (MLRA): 8—Columbia Plateau
Elevation: 1,500 to 3,000 feet
Mean annual precipitation: 11 to 15 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 110 to 150 days

Map Unit Composition

Conconully, north, and similar soils: 80 percent
Named dissimilar minor components: 15 percent
Unnamed dissimilar minor components: 5 percent

Conconully, North, and Similar Soils

Setting
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Side slopes
Aspect, representative: Northwest
Aspect, range: West to north (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 14 inches) over glacial till
Slope: 25 to 65 percent
Depth to restrictive feature: 26 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Stony 9-15 P.Z. (R008XY202WA)

Typical profile
A1—0 to 2 inches; extremely stony ashy loam
A2—2 to 13 inches; stony ashy loam
2Bw1—13 to 21 inches; gravelly fine sandy loam
2Bw2—21 to 33 inches; gravelly sandy loam
2Cd—33 to 60 inches; gravelly sandy loam

Named Dissimilar Minor Components

Molson soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Newbon soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainflanks

Rock outcrop
Composition: 5 percent

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

142—Conconully extremely stony ashy loam, 25 to 65 percent south slopes

Map Unit Setting

Major land resource area (MLRA): 8—Columbia Plateau
Elevation: 1,500 to 3,000 feet
Mean annual precipitation: 11 to 15 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 110 to 150 days

Map Unit Composition

Conconully, south, and similar soils: 80 percent
Named dissimilar minor components: 7 percent
Unnamed dissimilar minor components: 13 percent

Conconully, South, and Similar Soils

Setting
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Side slopes
Aspect, representative: South
Aspect, range: Southeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 14 inches) over glacial till
Slope: 25 to 65 percent
Depth to restrictive feature: 26 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Dry Stony 9-12 P.Z., aridic (R008XY201WA)

Typical profile
A1—0 to 2 inches; extremely stony ashy loam
A2—2 to 13 inches; stony ashy loam
2Bw1—13 to 21 inches; gravelly fine sandy loam
2Bw2—21 to 33 inches; gravelly sandy loam
2Cd—33 to 60 inches; gravelly sandy loam

Named Dissimilar Minor Components

Newbon soils
Composition: 7 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainflanks

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

143—Coopmont-Wocreek complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,000 to 6,000 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Coopmont and similar soils: 50 percent
Wocreek and similar soils: 35 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Coopmont and Similar Soils

Setting

Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities

Parent material: Volcanic ash and pumice (25 to 38 inches) over colluvium and residuum derived from granodiorite
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.6 inches)

Interpretive groups

Land capability classification, nonirrigated: 4e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile

A—0 to 3 inches; paragravelly ashy fine sandy loam
C—3 to 4 inches; ashy fine sandy loam
Bw1—4 to 10 inches; paragravelly ashy coarse sandy loam
Bw2—10 to 23 inches; paragravelly ashy coarse sandy loam
Bw3—23 to 29 inches; paragravelly ashy coarse sandy loam
2Bw4—29 to 37 inches; extremely stony coarse sandy loam
2C—37 to 60 inches; extremely gravelly sandy loam

Wocreek and Similar Soils

Setting

Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities

Parent material: Volcanic ash (40 to 60 inches) over glacial till
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry)/pinegrass (CES413)

Typical profile
A—0 to 7 inches; ashy sandy loam
Bw—7 to 34 inches; paragravelly ashy sandy loam
BC—34 to 51 inches; very gravelly ashy loamy coarse sand
2C—51 to 60 inches; gravelly sandy loam

Named Dissimilar Minor Components

Fears soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Upper third of mountainflanks

Remmel soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

144—Coxit-Pelican complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,200 to 5,300 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Coxit and similar soils: 60 percent
Pelican and similar soils: 30 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 5 percent

Coxit and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southeast
Aspect, range: Northeast to south (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (14 to 35 inches) over colluvium and residuum from metasedimentary rock
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None

Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A1—0 to 1 inch; gravelly ashy sandy loam
A2—1 to 7 inches; gravelly ashy sandy loam
Bw1—7 to 23 inches; very cobbly ashy sandy loam
Bw2—23 to 34 inches; very cobbly ashy sandy loam
2C1—34 to 48 inches; very cobbly sandy loam
2C2—48 to 60 inches; extremely cobbly sandy loam

Pelican and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southeast
Aspect, range: Northeast to south (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 25 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 35 to 50 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Ecological site: Mountain Park (R006XY702WA)

Typical profile
A—0 to 11 inches; gravelly ashy loam
2Bw1—11 to 18 inches; gravelly sandy loam
2Bw2—18 to 28 inches; very gravelly sandy loam
3C1—28 to 37 inches; very gravelly sandy loam
3C2—37 to 46 inches; very gravelly sandy loam
3Cd—46 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Nahahum soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production (Coxit soil), recreation, watershed, and wildlife habitat

145—Coxit-Pelican complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,200 to 5,300 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Coxit and similar soils: 60 percent
Pelican and similar soils: 30 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 5 percent

Coxit and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (14 to 35 inches) over colluvium and residuum from metasedimentary rock
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A1—0 to 1 inch; gravelly ashy sandy loam
A2—1 to 7 inches; gravelly ashy sandy loam
Bw1—7 to 23 inches; very cobbly ashy sandy loam
Bw2—23 to 34 inches; very cobbly ashy sandy loam
2C1—34 to 48 inches; very cobbly sandy loam
2C2—48 to 60 inches; extremely cobbly sandy loam

Pelican and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes

Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 25 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 35 to 50 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Mountain Park (R006XY702WA)

Typical profile
A—0 to 11 inches; gravelly ashy loam
2Bw1—11 to 18 inches; gravelly sandy loam
2Bw2—18 to 28 inches; very gravelly sandy loam
3C1—28 to 37 inches; very gravelly sandy loam
3C2—37 to 46 inches; very gravelly sandy loam
3Cd—46 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Nahahum soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production (Coxit soil), recreation, watershed, and wildlife habitat

146—Crocamp gravelly ashy sandy loam, 0 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 5,200 to 7,810 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Crocamp and similar soils: 90 percent
Unnamed dissimilar minor components: 10 percent

Crocamp and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (10 to 20 inches) mixed with colluvium derived from metamorphic and granitic rocks
Slope: 0 to 15 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: High Mountain Park (R006XY703WA)

Typical profile
A—0 to 10 inches; gravelly ashy sandy loam
AB—10 to 17 inches; very cobbly ashy sandy loam
2Bw—17 to 30 inches; very cobbly coarse sandy loam
2C—30 to 42 inches; very cobbly coarse sandy loam
2R—42 to 46 inches; unweathered bedrock

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

147—Crocamp-Burget complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 5,200 to 6,400 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Crocamp and similar soils: 50 percent
Burget and similar soils: 35 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Crocamp and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 20 inches) over colluvium from metamorphic and granitic rocks
Slope: 15 to 35 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: High Mountain Park (R006XY703WA) (fig. 3)

Typical profile
A—0 to 10 inches; very stony ashy sandy loam
AB—10 to 17 inches; very cobbly ashy sandy loam
2Bw—17 to 30 inches; very cobbly coarse sandy loam
2C—30 to 42 inches; very cobbly coarse sandy loam
2R—42 to 46 inches; unweathered bedrock

Burget and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Figure 3.—Landscape in an area of Crocamp-Burget complex, 15 to 35 percent slopes. The ecological site is High Mountain Park and is dominated by mountain big sagebrush.

Properties and qualities
Parent material: Mixed volcanic ash (7 to 11 inches) over colluvium and residuum from granite and metamorphic rock
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 6s
Ecological site: High Mountain Shallow (R006XY204WA)

Typical profile
A—0 to 8 inches; stony ashy coarse sandy loam
2Bw—8 to 11 inches; cobbly ashy coarse sandy loam
2Cr—11 to 21 inches; weathered bedrock

Named Dissimilar Minor Components

Rock outcrop
Composition: 5 percent

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

148—Crocamp-Burget complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 5,500 to 7,000 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Crocamp and similar soils: 60 percent
Burget and similar soils: 25 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Crocamp and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 20 inches) mixed with colluvium derived from metamorphic and granitic rocks

Slope: 35 to 65 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: High Mountain Park (R006XY703WA)

Typical profile
A—0 to 10 inches; very stony ashy sandy loam
AB—10 to 17 inches; very cobbly ashy sandy loam
2Bw—17 to 30 inches; very cobbly coarse sandy loam
2C—30 to 42 inches; very cobbly coarse sandy loam
2R—42 to 46 inches; unweathered bedrock

Burget and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) mixed with colluvium and residuum derived from granite and metamorphic rock
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 6s
Ecological site: High Mountain Shallow (R006XY204WA)

Typical profile
A—0 to 8 inches; stony ashy coarse sandy loam
2Bw—8 to 11 inches; cobbly ashy coarse sandy loam
2Cr—11 to 21 inches; weathered bedrock

Named Dissimilar Minor Components

Rock outcrop
Composition: 5 percent

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

149—Crocamp-Lithic Dystrocryepts-Rock outcrop complex, 35 to 90 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 6,200 to 7,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Crocamp and similar soils: 50 percent
Lithic Dystrocryepts, nonforested, xeric, and similar soils: 20 percent
Rock outcrop: 15 percent
Unnamed dissimilar minor components: 15 percent

Crocamp and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 20 inches) mixed with colluvium derived from metamorphic and granitic rocks
Slope: 35 to 65 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: High Mountain Park (R006XY703WA)

Typical profile
A—0 to 10 inches; very stony ashy sandy loam
AB—10 to 17 inches; very cobbly ashy sandy loam
2Bw—17 to 30 inches; very cobbly coarse sandy loam
2C—30 to 42 inches; very cobbly coarse sandy loam
2R—42 to 46 inches; unweathered bedrock

Lithic Dystrocryepts, Nonforested, Xeric, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash or mixed volcanic ash (4 to 12 inches) over colluvium and residuum
Slope: 35 to 90 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: High Mountain Shallow (R006XY204WA)

Typical profile
A—0 to 4 inches; very stony ashy fine sandy loam
Bw—4 to 10 inches; very stony fine sandy loam
2C—10 to 19 inches; extremely stony sandy loam
2R—19 to 29 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 90 percent. The land capability classification is 8.

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

150—Cryofluvents, 0 to 5 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains, 43A—Northern Rocky Mountains, and 6—Cascade Mountains, Eastern Slope
Elevation: 2,800 to 3,500 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Cryofluvents, somewhat poorly drained, and similar soils: 80 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 15 percent

Cryofluvents, Somewhat Poorly Drained, and Similar Soils

Setting
Landform: Glacial-trough valley floors on mountains, low stream terraces, and flood plains
Geomorphic position, two-dimensional: Toeslopes
Geomorphic position, three-dimensional: Mountainbases and rises
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed alluvium

Slope: 0 to 5 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Poorly drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: Occasional (See Water Features table.)
Frequency of ponding: Rare (See Water Features table.)
Seasonal high water table, minimum depth: About 20 to 30 inches (See Water Features table.)
Available water capacity, entire profile: Low (about 4.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 6w
Plant community classification: Subalpine fir series, wetland (CEW0)

Typical profile
A1—0 to 3 inches; loam
A2—3 to 7 inches; sandy loam
C1—7 to 24 inches; stratified very gravelly loamy sand to sandy loam
C2—24 to 48 inches; stratified very gravelly coarse sand to sandy loam
C3—48 to 60 inches; stratified very gravelly coarse sand to sandy loam

Named Dissimilar Minor Components

Riverwash
Composition: 5 percent
Landform: Flood plains in drainageways

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

151—Cubhill-Johntom complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,900 to 4,500 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 90 to 130 days

Map Unit Composition

Cubhill and similar soils: 65 percent
Johntom and similar soils: 25 percent
Named dissimilar minor components: 3 percent
Unnamed dissimilar minor components: 7 percent

Cubhill and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Lower and center thirds of mountainflanks
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (12 to 18 inches) over glacial till from volcanic and sedimentary rock

Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 8.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Ecological site: Loamy 15+ P.Z. (R006XY102WA)

Typical profile
A1—0 to 9 inches; gravelly ashy loam
A2—9 to 18 inches; gravelly ashy loam
2AB—18 to 25 inches; very gravelly loam
2Bt1—25 to 36 inches; very gravelly clay loam
2Bt2—36 to 60 inches; very gravelly clay loam

Johntom and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Colluvium and residuum from mixed volcanic and sedimentary rocks
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 3 inches; gravelly loam
A2—3 to 12 inches; very flaggy loam
R—12 to 16 inches; unweathered bedrock

Named Dissimilar Minor Components

Rock outcrop
Composition: 3 percent

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

152—Devore-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 6,500 to 7,450 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 37 to 40 degrees F
Frost-free period: 70 to 85 days

Map Unit Composition

Devore, cold, and similar soils: 50 percent
Rock outcrop: 30 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 10 percent

Devore, Cold, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metamorphic rock
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Whitebark pine/grouse blueberry (huckleberry)/smooth woodrush (CAS311)

Typical profile
C—0 to 1 inch; stony ashy silt loam
2A—1 to 4 inches; very stony ashy fine sandy loam
2Bw—4 to 11 inches; very stony ashy fine sandy loam
3C1—11 to 23 inches; extremely stony coarse sandy loam
3C2—23 to 32 inches; extremely stony coarse sandy loam
3R—32 to 36 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Remmel soils
Composition: 5 percent

Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Treebutte soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

153—Devore-Rock outcrop complex, warm, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains, 3—Olympic and Cascade Mountains, and 6—Cascade Mountains, Eastern Slope
Elevation: 5,100 to 6,500 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Devore, warm, and similar soils: 60 percent
Rock outcrop: 25 percent
Named dissimilar minor components: 13 percent
Unnamed dissimilar minor components: 2 percent

Devore, Warm, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metamorphic rock
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
C—0 to 1 inch; stony ashy fine sandy loam
2A—1 to 4 inches; very stony ashy fine sandy loam
2Bw—4 to 11 inches; very stony ashy fine sandy loam
3C1—11 to 23 inches; extremely stony coarse sandy loam
3C2—23 to 32 inches; extremely stony coarse sandy loam
3R—32 to 36 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Lithic Dystrocryepts
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Manley soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases

Devore soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

154—Devore-Rock outcrop complex, warm, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains, 43A—Northern Rocky Mountains, and 6—Cascade Mountains, Eastern Slope
Elevation: 5,400 to 6,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Devore, warm, and similar soils: 55 percent
Rock outcrop: 30 percent
Named dissimilar minor components: 15 percent

Devore, Warm, and Similar Soils

Setting
Landform: Mountains

Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metamorphic rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
C—0 to 1 inch; stony ashy fine sandy loam
2A—1 to 4 inches; very stony ashy fine sandy loam
2Bw—4 to 11 inches; very stony ashy fine sandy loam
3C1—11 to 23 inches; extremely stony coarse sandy loam
3C2—23 to 32 inches; extremely stony coarse sandy loam
3R—32 to 36 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Lithic Dystrocryepts
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Manley soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases

Sitdown soils
Composition: 5 percent
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, risers, and treads

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

155—Devore-Treebutte complex, 0 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 5,400 to 7,200 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Devore, cool, and similar soils: 50 percent
Treebutte and similar soils: 30 percent
Named dissimilar minor components: 2 percent
Unnamed dissimilar minor components: 18 percent

Devore, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metamorphic rock
Slope: 0 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
C—0 to 1 inch; stony ashy fine sandy loam
2A—1 to 4 inches; very stony ashy fine sandy loam
2Bw—4 to 11 inches; very stony ashy fine sandy loam
3C1—11 to 23 inches; extremely stony coarse sandy loam
3C2—23 to 32 inches; extremely stony coarse sandy loam
3R—32 to 36 inches; unweathered bedrock

Treebutte and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 10 inches) over colluvium and residuum from granitic and metamorphic rocks
Slope: 0 to 15 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 6s
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
A—0 to 1 inch; very stony ashy sandy loam
Bw—1 to 10 inches; very stony ashy sandy loam
2C—10 to 19 inches; extremely stony coarse sandy loam
2R—19 to 29 inches; unweathered bedrock

Named Dissimilar Minor Components

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

156—Devore-Treebutte-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 4,800 to 6,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Devore, cool, and similar soils: 45 percent
Treebutte and similar soils: 30 percent
Rock outcrop: 10 percent
Unnamed dissimilar minor components: 15 percent

Devore, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: South
Aspect, range: North to northwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metamorphic rock
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES412) and subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
C—0 to 1 inch; stony ashy sandy loam
2A—1 to 4 inches; very stony ashy fine sandy loam
2Bw—4 to 11 inches; very stony ashy fine sandy loam
3C1—11 to 23 inches; extremely stony coarse sandy loam
3C2—23 to 32 inches; extremely stony coarse sandy loam
3R—32 to 36 inches; unweathered bedrock

Treebutte and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops
Aspect, representative: South
Aspect, range: North to northwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 10 inches) over colluvium and residuum from granitic and metamorphic rocks
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 6s
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426) and subalpine fir/grouse blueberry (huckleberry) (CES412)

Typical profile
A—0 to 1 inch; very stony ashy sandy loam
Bw—1 to 10 inches; very stony ashy sandy loam
2C—10 to 19 inches; extremely stony coarse sandy loam
2R—19 to 23 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

157—Devore-Treebutte-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 5,400 to 7,200 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Devore, cool, and similar soils: 45 percent
Treebutte and similar soils: 25 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 15 percent

Devore, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metamorphic rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
C—0 to 1 inch; stony ashy sandy loam
2A—1 to 4 inches; very stony ashy fine sandy loam
2Bw—4 to 11 inches; very stony ashy fine sandy loam
3C1—11 to 23 inches; extremely stony coarse sandy loam

3C2—23 to 32 inches; extremely stony coarse sandy loam
3R—32 to 36 inches; unweathered bedrock

Treebutte and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 10 inches) over colluvium and residuum from granitic and metamorphic rocks
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
A—0 to 1 inch; very stony ashy sandy loam
Bw—1 to 10 inches; very stony ashy sandy loam
2C—10 to 19 inches; extremely stony coarse sandy loam
2R—19 to 23 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Myerscreek soils
Composition: 5 percent
Landform: Glacial moraines on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

158—Doe-Wellie-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,800 to 4,700 feet
Mean annual precipitation: 18 to 24 inches

Mean annual air temperature: 42 to 46 degrees F
Frost-free period: 95 to 120 days

Map Unit Composition

Doe and similar soils: 55 percent
Wellie and similar soils: 25 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 10 percent

Doe and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: West
Aspect, range: South to northwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (20 to 35 inches) over colluvium, glacial outwash, or glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 35 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pachistima/pinegrass (CDS412)

Typical profile
A—0 to 8 inches; very stony ashy coarse sandy loam
Bw—8 to 24 inches; very cobbly ashy coarse sandy loam
2C—24 to 60 inches; very cobbly loamy coarse sand

Wellie and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: West
Aspect, range: South to northwest (clockwise)

Properties and qualities
Parent material: Colluvium derived from granite
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pachistima/pinegrass (CDS412)

Typical profile
A—0 to 3 inches; extremely stony loamy coarse sand
C1—3 to 16 inches; extremely cobbly loamy coarse sand
C2—16 to 60 inches; extremely cobbly loamy coarse sand

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Lithic Haploxerepts
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Pebcreek soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Rubble land
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

159—Donavan ashy loam, 3 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 1,800 to 4,500 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Donavan and similar soils: 80 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 10 percent

Donavan and Similar Soils

Setting
Landform: Glaciated foothills and glaciated mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Center third of mountainflanks, lower third of mountainflanks, side slopes, head slopes, base slopes, and nose slopes

Aspect, representative: Southwest
Aspect, range: East to northwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 19 inches) over glacial till
Slope: 3 to 15 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately low
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: High (about 10.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 3e
Land capability classification, irrigated: 3e
Plant community classification: Ponderosa pine/bluebunch wheatgrass (CPG141)

Typical profile
A1—0 to 2 inches; ashy loam
A2—2 to 7 inches; ashy silt loam
Bw—7 to 20 inches; ashy loam
2Cd1—20 to 39 inches; gravelly silt loam
2Cd2—39 to 60 inches; gravelly sandy loam

Named Dissimilar Minor Components

Peka soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Vanbrunt soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Republic soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

160—Donavan ashy loam, 8 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 1,800 to 4,000 feet
Mean annual precipitation: 14 to 20 inches

Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Donavan and similar soils: 100 percent

Donavan and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: Southwest
Aspect, range: South to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 15 inches) over glacial till
Slope: 8 to 25 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Land capability classification, irrigated: 6e
Plant community classification: Ponderosa pine/bluebunch wheatgrass (CPG141)

Typical profile
A—0 to 6 inches; ashy loam
Bw1—6 to 10 inches; gravelly ashy loam
Bw2—10 to 15 inches; gravelly ashy sandy loam
2BC—15 to 26 inches; gravelly sandy loam
2Cd1—26 to 33 inches; gravelly sandy loam
2Cd2—33 to 60 inches; gravelly sandy loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

161—Donavan ashy sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,600 to 3,200 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Donavan, moist, and similar soils: 85 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Donavan, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: Southwest
Aspect, range: Southeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 15 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 4s
Plant community classification: Ponderosa pine/bitterbrush/bluebunch wheatgrass (CPS241)

Typical profile
A—0 to 6 inches; ashy sandy loam
Bw1—6 to 10 inches; gravelly ashy loam
Bw2—10 to 15 inches; gravelly ashy sandy loam
2BC—15 to 26 inches; gravelly sandy loam
2Cd1—26 to 33 inches; gravelly sandy loam
2Cd2—33 to 60 inches; gravelly sandy loam

Named Dissimilar Minor Components

Peka soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Republic soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

162—Donavan-Rock outcrop complex, 25 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 1,800 to 4,000 feet

Mean annual precipitation: 14 to 20 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Donavan and similar soils: 75 percent
Rock outcrop: 25 percent

Donavan and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: West
Aspect, range: South to northwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 15 inches) over glacial till
Slope: 25 to 65 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Ponderosa pine/bluebunch wheatgrass (CPG141)

Typical profile
A—0 to 6 inches; stony ashy loam
Bw1—6 to 10 inches; gravelly ashy loam
Bw2—10 to 15 inches; gravelly ashy sandy loam
2BC—15 to 26 inches; gravelly sandy loam
2Cd1—26 to 33 inches; gravelly sandy loam
2Cd2—33 to 60 inches; gravelly sandy loam

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 25 to 65 percent. The land capability classification is 8.

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

163—Enson ashy sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,400 to 4,000 feet
Mean annual precipitation: 20 to 24 inches

Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Enson and similar soils: 85 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Enson and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: East
Aspect, range: North to south (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (12 to 16 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 3 inches; ashy sandy loam
Bw1—3 to 6 inches; ashy sandy loam
Bw2—6 to 15 inches; ashy sandy loam
2C—15 to 33 inches; gravelly sandy loam
2Cd1—33 to 44 inches; gravelly loamy sand
2Cd2—44 to 60 inches; very gravelly loamy sand

Named Dissimilar Minor Components

Merkel soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Newhorn soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

164—Farway gravelly ashy sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,400 to 3,900 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Farway, moist, and similar soils: 85 percent
Named dissimilar minor components: 7 percent
Unnamed dissimilar minor components: 8 percent

Farway, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: East
Aspect, range: West to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (16 to 30 inches) over colluvium and glacial till from volcanic and sedimentary rock
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pachistima/pinegrass (CDS412)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw1—4 to 9 inches; gravelly ashy sandy loam
Bw2—9 to 20 inches; gravelly ashy sandy loam
2C—20 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Veridge soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Gatewall soils
Composition: 2 percent
Landform: Mountains

Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

165—Fears-Rock outcrop complex, 50 to 90 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,500 to 5,600 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 80 days

Map Unit Composition

Fears and similar soils: 75 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 10 percent

Fears and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Upper third of mountainflanks
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (30 to 60 inches) over colluvium from granitic rocks
Slope: 50 to 90 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/pinegrass (CEG310)

Typical profile
A/C—0 to 4 inches; gravelly ashy sandy loam
Bw1—4 to 14 inches; very gravelly ashy sandy loam
Bw2—14 to 33 inches; extremely gravelly ashy sandy loam
Bw3—33 to 40 inches; extremely cobbly ashy coarse sandy loam
C—40 to 60 inches; extremely gravelly ashy sandy loam

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 50 to 90 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Coopmont soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops

Wocreek soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

166—Finney-Banker complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 3—Olympic and Cascade Mountains
Elevation: 4,400 to 5,900 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Finney, dry, and similar soils: 65 percent
Banker and similar soils: 20 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Finney, Dry, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metasedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES342)

Typical profile
A—0 to 2 inches; gravelly ashy sandy loam
Bw—2 to 10 inches; gravelly ashy sandy loam
2C1—10 to 20 inches; very gravelly sandy loam
2C2—20 to 32 inches; very gravelly sandy loam
3C3—32 to 43 inches; very gravelly sandy loam
3R—43 to 47 inches; unweathered bedrock

Banker and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, summits, and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Down-slope shape: Convex
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (3 to 6 inches) over colluvium and residuum
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
A—0 to 4 inches; channery ashy sandy loam
2Bw—4 to 13 inches; very channery sandy loam
2C—13 to 18 inches; very channery sandy loam
2R—18 to 22 inches; unweathered bedrock

Named Dissimilar Minor Components

Manley soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases

Ortellcreek soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

167—Finney-Myerscreek complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,400 to 5,600 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Finney and similar soils: 55 percent
Myerscreek, moist, and similar soils: 30 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Finney and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Southeast
Aspect, range: Northwest to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metasedimentary rock
Slope: 15 to 35 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/twinflower (CEF222)

Typical profile
A—0 to 2 inches; gravelly ashy sandy loam
Bw—2 to 10 inches; gravelly ashy sandy loam
2C1—10 to 20 inches; very gravelly sandy loam
2C2—20 to 32 inches; very gravelly sandy loam
3C3—32 to 43 inches; very gravelly sandy loam
3R—43 to 47 inches; unweathered bedrock

Myerscreek, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southeast
Aspect, range: Northwest to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 35 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/twinflower (CEF222)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; ashy fine sandy loam
2Bw—4 to 12 inches; ashy fine sandy loam
3CB—12 to 31 inches; very gravelly sandy loam
3Cd1—31 to 46 inches; very gravelly sandy loam
3Cd2—46 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Manley soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

168—Gahee ashy loam, 0 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 4,200 to 6,500 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 75 to 95 days

Map Unit Composition

Gahee and similar soils: 100 percent

Gahee and Similar Soils

Setting
Landform: Glacial terraces
Geomorphic position, three-dimensional: Treads
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (16 to 22 inches) over glacial outwash
Slope: 0 to 15 percent

Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
C—0 to 3 inches; ashy very fine sandy loam
Bw—3 to 19 inches; ashy loam
2C1—19 to 31 inches; sandy loam
3C2—31 to 60 inches; coarse sand

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

169—Gatewall ashy sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 4,200 to 5,400 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Gatewall and similar soils: 80 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 15 percent

Gatewall and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: South
Aspect, range: North to northwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 30 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES342)

Typical profile
A—0 to 4 inches; ashy sandy loam
Bw—4 to 13 inches; ashy sandy loam
2BC—13 to 24 inches; very gravelly sandy loam
2Cd1—24 to 34 inches; very gravelly sandy loam
2Cd2—34 to 39 inches; very gravelly sandy loam
3Cd3—39 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Ortellcreek soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

170—Gatewall ashy sandy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 4,500 to 5,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Gatewall and similar soils: 75 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 15 percent

Gatewall and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 30 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None

Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES342)

Typical profile
A—0 to 4 inches; ashy sandy loam
Bw—4 to 13 inches; ashy sandy loam
2BC—13 to 24 inches; very gravelly sandy loam
2Cd1—24 to 34 inches; very gravelly sandy loam
2Cd2—34 to 39 inches; very gravelly sandy loam
3Cd3—39 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Ortellcreek soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Volmont soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Summits, shoulders, and backslopes
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

171—Gatewall ashy sandy loam, warm, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 3—Olympic and Cascade Mountains
Elevation: 5,100 to 5,900 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Gatewall, warm, and similar soils: 85 percent
Named dissimilar minor components: 6 percent
Unnamed dissimilar minor components: 9 percent

Gatewall, Warm, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: Northeast to north (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 30 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/pinegrass (CEG310)

Typical profile
A—0 to 4 inches; ashy sandy loam
Bw—4 to 13 inches; ashy sandy loam
2BC—13 to 24 inches; very gravelly sandy loam
2Cd1—24 to 34 inches; very gravelly sandy loam
2Cd2—34 to 39 inches; very gravelly sandy loam
3Cd3—39 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Volmont soils
Composition: 6 percent
Landform: Mountains
Geomorphic position, two-dimensional: Summits, shoulders, and backslopes
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

172—Gatewall-Volmont complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 3—Olympic and Cascade Mountains
Elevation: 4,500 to 5,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Gatewall and similar soils: 60 percent
Volmont and similar soils: 25 percent
Named dissimilar minor components: 7 percent
Unnamed dissimilar minor components: 8 percent

Gatewall and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes

Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 30 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES342)

Typical profile
A—0 to 4 inches; ashy sandy loam
Bw—4 to 13 inches; ashy sandy loam
2BC—13 to 24 inches; very gravelly sandy loam
2Cd1—24 to 34 inches; very gravelly sandy loam
2Cd2—34 to 39 inches; very gravelly sandy loam
3Cd3—39 to 60 inches; very gravelly sandy loam

Volmont and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Summits, shoulders, and backslopes
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium and residuum from volcanic rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/pinegrass (CEG310)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw—4 to 13 inches; very gravelly ashy sandy loam
2BC—13 to 21 inches; very gravelly sandy loam
2C—21 to 32 inches; very gravelly sandy loam
2R—32 to 36 inches; unweathered bedrock

Named Dissimilar Minor Components

Ortellcreek soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

173—Goddard-Lithic Haploxerepts complex, 0 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,800 to 4,000 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Goddard and similar soils: 70 percent
Lithic Haploxerepts, forested, moist, and similar soils: 15 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Goddard and Similar Soils

Setting
Landform: Outwash terraces
Geomorphic position, three-dimensional: Treads
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial outwash
Slope: 0 to 15 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 3e
Plant community classification: Douglas-fir/dwarf huckleberry (CDS831 and CDS813)

Typical profile
A—0 to 6 inches; ashy fine sandy loam
Bw—6 to 12 inches; gravelly ashy sandy loam

2C1—12 to 25 inches; very gravelly loamy sand
2C2—25 to 60 inches; extremely gravelly loamy sand

Lithic Haploxerepts, Forested, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over bedrock
Slope: 3 to 15 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655) and Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 3 inches; cobbly ashy sandy loam
Bw—3 to 12 inches; cobbly ashy sandy loam
2C—12 to 18 inches; very gravelly sandy loam
2R—18 to 22 inches; unweathered bedrock

Named Dissimilar Minor Components

Rock outcrop
Composition: 5 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

174—Goddard-Parmenter complex, 0 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 3,600 to 4,600 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 39 to 42 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Goddard and similar soils: 60 percent
Parmenter and similar soils: 30 percent

Named dissimilar minor components: 7 percent
Unnamed dissimilar minor components: 3 percent

Goddard and Similar Soils

Setting
Landform: Outwash terraces
Geomorphic position, three-dimensional: Treads
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial outwash
Slope: 0 to 15 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 3e
Plant community classification: Douglas-fir/dwarf huckleberry (CDS813 and CDS831)

Typical profile
A—0 to 6 inches; ashy fine sandy loam
Bw—6 to 12 inches; gravelly ashy sandy loam
2C1—12 to 25 inches; very gravelly loamy sand
2C2—25 to 60 inches; extremely gravelly loamy sand

Parmenter and Similar Soils

Setting
Landform: Glacial outwash terraces
Geomorphic position, three-dimensional: Treads
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (14 to 25 inches) over glacial outwash
Slope: 0 to 15 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 3e
Plant community classification: Douglas-fir/dwarf huckleberry (CDS831) and Douglas-fir/dwarf huckleberry (CDS813)

Typical profile
A—0 to 3 inches; ashy fine sandy loam
Bw1—3 to 12 inches; ashy fine sandy loam
Bw2—12 to 22 inches; ashy fine sandy loam

2C1—22 to 34 inches; very gravelly loamy coarse sand
2C2—34 to 60 inches; very gravelly loamy coarse sand

Named Dissimilar Minor Components

Sitdown soils
Composition: 5 percent
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, risers, and treads

Wapal soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

175—Goddard-Parmenter complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 4,500 to 5,100 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Goddard, warm, and similar soils: 50 percent
Parmenter, dry, and similar soils: 35 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Goddard, Warm, and Similar Soils

Setting
Landform: Outwash terraces
Geomorphic position, three-dimensional: Risers and treads
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial outwash
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 6 inches; ashy fine sandy loam
Bw—6 to 12 inches; gravelly ashy sandy loam
2C1—12 to 25 inches; very gravelly loamy sand
2C2—25 to 60 inches; extremely gravelly loamy sand

Parmenter, Dry, and Similar Soils

Setting
Landform: Glacial outwash terraces
Geomorphic position, three-dimensional: Risers
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 25 inches) over glacial outwash
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 3 inches; ashy fine sandy loam
Bw1—3 to 12 inches; ashy fine sandy loam
Bw2—12 to 22 inches; ashy fine sandy loam
2C1—22 to 34 inches; very gravelly loamy coarse sand
2C2—34 to 60 inches; very gravelly loamy coarse sand

Named Dissimilar Minor Components

Nevine soils
Composition: 5 percent
Landform: Glacial moraines

Wapal soils
Composition: 5 percent
Landform: Outwash terraces
Geomorphic position, three-dimensional: Treads and risers

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

176—Granflat gravelly ashy sandy loam, 0 to 10 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope

Elevation: 2,600 to 3,200 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 39 to 42 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Granflat and similar soils: 85 percent
Named dissimilar minor components: 8 percent
Unnamed dissimilar minor components: 7 percent

Granflat and Similar Soils

Setting
Landform: Low alluvial terraces on outwash terraces
Geomorphic position, three-dimensional: Treads
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (10 to 16 inches) over with alluvium and glacial outwash
Slope: 0 to 10 percent
Depth to restrictive feature: 10 to 16 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 4s
Plant community classification: Douglas-fir/dwarf huckleberry (CDS831)

Typical profile
A—0 to 6 inches; gravelly ashy sandy loam
AB—6 to 9 inches; very cobbly ashy sandy loam
Bw—9 to 15 inches; very cobbly ashy sandy loam
2C1—15 to 25 inches; extremely cobbly sand
2C2—25 to 60 inches; extremely gravelly sand

Named Dissimilar Minor Components

Goddard soils
Composition: 5 percent
Landform: Outwash terraces
Geomorphic position, three-dimensional: Risers and treads

Sitdown soils
Composition: 3 percent
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, treads, and risers

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

177—Granflat gravelly ashy sandy loam, warm, 0 to 10 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,600 to 2,900 feet
Mean annual precipitation: 20 to 22 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 95 to 120 days

Map Unit Composition

Granflat, warm, and similar soils: 85 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Granflat, Warm, and Similar Soils

Setting
Landform: Low alluvial terraces on outwash terraces
Geomorphic position, three-dimensional: Treads
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (10 to 16 inches) over with alluvium and glacial outwash
Slope: 0 to 10 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 4s
Plant community classification: Douglas-fir/common snowberry (CDS636)

Typical profile
A—0 to 6 inches; gravelly ashy sandy loam
AB—6 to 9 inches; very cobbly ashy sandy loam
Bw—9 to 15 inches; very cobbly ashy sandy loam
2C1—15 to 25 inches; extremely cobbly sand
2C2—25 to 60 inches; extremely gravelly sand

Named Dissimilar Minor Components

Wapal soils
Composition: 5 percent
Landform: Outwash terraces
Geomorphic position, three-dimensional: Treads and risers

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

178—Growden ashy fine sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 5,500 to 6,500 feet
Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 35 to 37 degrees F
Frost-free period: 80 to 90 days

Map Unit Composition

Growden and similar soils: 100 percent

Growden and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from siliceous material
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A1—0 to 6 inches; ashy fine sandy loam
A2—6 to 12 inches; ashy fine sandy loam
2A3—12 to 24 inches; stony fine sandy loam
2AC—24 to 36 inches; very stony sandy loam
2C—36 to 60 inches; stony sandy loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

179—Growden ashy fine sandy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 5,500 to 6,500 feet
Mean annual precipitation: 20 to 30 inches

Mean annual air temperature: 35 to 37 degrees F
Frost-free period: 80 to 90 days

Map Unit Composition

Growden and similar soils: 100 percent

Growden and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from siliceous material
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A1—0 to 6 inches; ashy fine sandy loam
A2—6 to 12 inches; ashy fine sandy loam
2A3—12 to 24 inches; stony fine sandy loam
2AC—24 to 36 inches; very stony sandy loam
2C—36 to 60 inches; stony sandy loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

180—Growden-Pepoon-Oxerine complex, 15 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 5,500 to 6,500 feet
Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 35 to 44 degrees F
Frost-free period: 80 to 110 days

Map Unit Composition

Growden and similar soils: 55 percent
Pepoon and similar soils: 20 percent
Oxerine, moist, and similar soils: 15 percent
Named dissimilar minor components: 10 percent

Growden and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southwest
Aspect, range: South to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from siliceous material
Slope: 15 to 40 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A1—0 to 6 inches; ashy fine sandy loam
A2—6 to 12 inches; ashy fine sandy loam
2A3—12 to 24 inches; stony fine sandy loam
2AC—24 to 36 inches; very stony sandy loam
2C—36 to 60 inches; stony sandy loam

Pepoon and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops
Aspect, representative: Southwest
Aspect, range: South to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 15 inches) over bedrock
Slope: 15 to 50 percent
Depth to restrictive feature: 8 to 15 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Mountain Park (R043AY702WA)

Typical profile
A1—0 to 5 inches; stony ashy loam
A2—5 to 10 inches; extremely stony ashy loam
R—10 to 14 inches; unweathered bedrock

Oxerine, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: Southwest
Aspect, range: South to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metasedimentary and andesitic rock
Slope: 30 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/ninebark/twinflower (CDS716)

Typical profile
A—0 to 4 inches; gravelly ashy fine sandy loam
Bw—4 to 10 inches; gravelly ashy fine sandy loam
2C1—10 to 19 inches; very gravelly sandy loam
2C2—19 to 31 inches; extremely cobbly sandy loam
2R—31 to 35 inches; unweathered bedrock

Named Dissimilar Minor Components

Edds soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Leonardo soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Use and Management

Major uses: Livestock grazing, timber production (Growden and Oxerine soils), recreation, watershed, and wildlife habitat

181—Histic Cryaquepts-Cryohemists complex, 0 to 10 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 3—Olympic and Cascade Mountains

Elevation: 5,000 to 6,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 60 to 80 days

Map Unit Composition

Histic Cryaquepts and similar soils: 50 percent
Cryohemists and similar soils: 40 percent
Unnamed dissimilar minor components: 10 percent

Histic Cryaquepts and Similar Soils

Setting
Landform: Nearly level valley floors in mountain valleys
Geomorphic position, two-dimensional: Toeslopes
Geomorphic position, three-dimensional: Mountainbases
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Organic soil material over alluvium and glacial till
Slope: 0 to 10 percent
Depth to restrictive feature: 8 to 16 inches to strongly contrasting textural stratification
Drainage class: Very poorly drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: Frequent (See Water Features table.)
Seasonal high water table, minimum depth: At the soil surface (See Water Features table.)
Available water capacity, entire profile: Moderate (about 7.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6w
Plant community classification: Farr Willow/saw-leaved (firethread) sedge (SW1215) (fig. 4)

Typical profile
Oa—0 to 8 inches; mucky peat
A—8 to 10 inches; silt loam
Bw—10 to 15 inches; fine sandy loam
2Cg1—15 to 21 inches; very gravelly sandy loam
2Cg2—21 to 34 inches; gravelly sandy loam
3Cg3—34 to 60 inches; very gravelly loamy sand

Cryohemists and Similar Soils

Setting
Landform: Bottoms of valleys on mountains
Geomorphic position, two-dimensional: Toeslopes
Geomorphic position, three-dimensional: Mountainbases
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Organic soil material over alluvium and glacial till
Slope: 0 to 5 percent
Depth to restrictive feature: 16 to 40 inches to strongly contrasting textural stratification
Drainage class: Very poorly drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high

Figure 4.—Landscape in an area of Histic Cryaquepts-Cryohemists complex, 0 to 10 percent slopes. The plant association on this wetland site is Farr Willow/saw-leaved (firethread) sedge.

Frequency of flooding: Occasional (See Water Features table.)
Frequency of ponding: Frequent (See Water Features table.)
Seasonal high water table, minimum depth: At the soil surface (See Water Features table.)
Available water capacity, entire profile: High (about 11.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6w
Plant community classification: Farr Willow/saw-leaved (firethread) sedge (SW1215)

Typical profile
Oe—0 to 14 inches; mucky peat
Oa—14 to 19 inches; muck
2Cg1—19 to 26 inches; fine sandy loam
2Cg2—26 to 33 inches; gravelly sandy loam
3Cg3—33 to 60 inches; very gravelly loamy sand

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

182—Hodgson ashy silt loam, 3 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 1,300 to 2,000 feet
Mean annual precipitation: 15 to 21 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Hodgson and similar soils: 95 percent
Unnamed dissimilar minor components: 5 percent

Hodgson and Similar Soils

Setting
Landform: Glacial lake terraces
Geomorphic position, three-dimensional: Treads
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial lake sediments
Slope: 3 to 15 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Moderately well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: 6 to 30 inches (See Water Features table.)
Available water capacity, entire profile: High (about 11.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 3e
Land capability classification, irrigated: 4e
Plant community classification: Douglas-fir/common snowberry (CDS636)

Typical profile
A—0 to 6 inches; ashy silt loam
Bw—6 to 9 inches; ashy silt loam
2Bt—9 to 15 inches; silt loam
2C1—15 to 25 inches; silt loam
2C2—25 to 40 inches; silty clay loam
2C3—40 to 60 inches; silty clay loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

183—Inkler gravelly ashy silt loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,200 to 3,000 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Inkler and similar soils: 100 percent

Inkler and Similar Soils

Setting
Landform: Mountains

Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: Southeast
Aspect, range: East to south (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium or glacial till
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/ninebark (CDS715)

Typical profile
A—0 to 4 inches; gravelly ashy silt loam
Bw1—4 to 9 inches; gravelly ashy silt loam
Bw2—9 to 21 inches; gravelly ashy silt loam
2C1—21 to 31 inches; very gravelly loam
2C2—31 to 46 inches; extremely cobbly loam
2C3—46 to 60 inches; extremely cobbly loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

184—Jantill-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 5,800 to 6,800 feet
Mean annual precipitation: 35 to 40 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Jantill and similar soils: 60 percent
Rock outcrop: 20 percent
Named dissimilar minor components: 8 percent
Unnamed dissimilar minor components: 12 percent

Jantill and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: North
Aspect, range: West to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till and glacial outwash
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/Cascade azalea (CES214 and CES211)

Typical profile
C—0 to 1 inch; stony ashy silt loam
2A—1 to 4 inches; stony ashy sandy loam
2Bw—4 to 11 inches; stony ashy sandy loam
3C1—11 to 27 inches; very stony loamy sand
3C2—27 to 60 inches; very stony loamy sand

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Devore soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Lithic Dystrocryepts
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

185—Jimbluff ashy sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,000 to 4,100 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Jimbluff and similar soils: 85 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Jimbluff and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes and footslopes
Geomorphic position, three-dimensional: Mountainbases
Aspect, representative: North
Aspect, range: Southwest to southeast (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 20 inches) over alluvium and glacial till
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pachistima/pinegrass (CDS412)

Typical profile
A—0 to 4 inches; ashy sandy loam
Bw1—4 to 9 inches; gravelly ashy sandy loam
Bw2—9 to 17 inches; very cobbly ashy sandy loam
2C1—17 to 24 inches; very cobbly sandy loam
2C2—24 to 35 inches; extremely cobbly coarse sandy loam
3C3—35 to 60 inches; extremely gravelly loamy sand

Named Dissimilar Minor Components

Longort soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Nicmar soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

186—Jimbluff gravelly ashy sandy loam, 5 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,200 to 3,600 feet
Mean annual precipitation: 20 to 24 inches

Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Jimbluff and similar soils: 85 percent
Unnamed dissimilar minor components: 15 percent

Jimbluff and Similar Soils

Setting
Landform: Alluvial fans on mountains
Geomorphic position, two-dimensional: Footslopes and toeslopes
Geomorphic position, three-dimensional: Mountainbases
Aspect, representative: Northeast
Aspect, range: North to east (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 20 inches) over alluvium and glacial till
Slope: 5 to 25 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 4s
Plant community classification: Douglas-fir/common snowberry/pinegrass (CDS638)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw1—4 to 9 inches; gravelly ashy sandy loam
Bw2—9 to 17 inches; very cobbly ashy sandy loam
2C1—17 to 24 inches; very cobbly sandy loam
2C2—24 to 35 inches; extremely cobbly coarse sandy loam
3C3—35 to 60 inches; extremely gravelly loamy sand

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

187—Johntom-Borgeau-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,800 to 4,500 feet
Mean annual precipitation: 14 to 20 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 110 to 140 days

Map Unit Composition

Johntom and similar soils: 45 percent
Borgeau and similar soils: 30 percent

Rock outcrop: 10 percent
Named dissimilar minor components: 15 percent

Johntom and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Colluvium and residuum from mixed volcanic and sedimentary rocks
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 3 inches; gravelly loam
A2—3 to 12 inches; very flaggy loam
R—12 to 16 inches; unweathered bedrock

Borgeau and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial till and colluvium from volcanic rock
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Ecological site: Cool Stony 15+ P.Z. (R006XY203WA)

Typical profile
A1—0 to 5 inches; ashy loam
A2—5 to 14 inches; gravelly ashy loam

2Bw—14 to 27 inches; very gravelly loam
2BC—27 to 41 inches; very gravelly loam
2C—41 to 60 inches; very gravelly sandy loam

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Baldknob soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Scoap soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Thout soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

188—Johntom-Foggydew-Rock outcrop complex, 35 to 75 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,600 to 4,000 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 40 to 52 degrees F
Frost-free period: 90 to 150 days

Map Unit Composition

Johntom and similar soils: 50 percent
Foggydew and similar soils: 20 percent
Rock outcrop: 15 percent
Unnamed dissimilar minor components: 15 percent

Johntom and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Colluvium and residuum from mixed volcanic and sedimentary rocks

Slope: 35 to 75 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 3 inches; gravelly loam
A2—3 to 12 inches; very flaggy loam
R—12 to 16 inches; unweathered bedrock

Foggydew and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (20 to 30 inches) over colluvium, residuum, and glacial till from volcanic and sedimentary rock
Slope: 35 to 75 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Loamy 15+ P.Z. (R006XY102WA)

Typical profile
A1—0 to 7 inches; gravelly ashy sandy loam
A2—7 to 12 inches; very gravelly ashy sandy loam
A3—12 to 20 inches; very gravelly ashy sandy loam
2Bw1—20 to 27 inches; extremely gravelly sandy loam
2Bw2—27 to 42 inches; extremely gravelly sandy loam
2Bw3—42 to 53 inches; extremely gravelly sandy loam
2R—53 to 57 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 75 percent. The land capability classification is 8.

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

189—Johntom-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,900 to 4,500 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 40 to 50 degrees F
Frost-free period: 90 to 130 days

Map Unit Composition

Johntom and similar soils: 60 percent
Rock outcrop: 30 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 5 percent

Johntom and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Colluvium and residuum from mixed volcanic and sedimentary rocks
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 3 inches; gravelly loam
A2—3 to 12 inches; very flaggy loam
R—12 to 16 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Lithic Ultic Haploxerolls
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

190—Johntom-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,500 to 4,300 feet
Mean annual precipitation: 14 to 20 inches
Mean annual air temperature: 44 to 50 degrees F
Frost-free period: 110 to 140 days

Map Unit Composition

Johntom and similar soils: 70 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 15 percent
Unnamed dissimilar minor components: 5 percent

Johntom and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Colluvium and residuum from mixed volcanic and sedimentary rocks
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 3 inches; gravelly loam
A2—3 to 12 inches; very flaggy loam
R—12 to 16 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Baldknob soils
Composition: 5 percent
Landform: Mountains

Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Borgeau soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Thout soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

191—Kartar ashy sandy loam, 3 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 8—Columbia Plateau
Elevation: 1,800 to 3,500 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Kartar and similar soils: 100 percent

Kartar and Similar Soils

Setting
Landform: Glacial till plains
Geomorphic position, three-dimensional: Treads
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (20 to 30 inches) over glacial till and glacial outwash
Slope: 3 to 15 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 3e
Land capability classification, irrigated: 4e
Ecological site: Loamy 9-15 P.Z. (R008XY102WA)

Typical profile
A—0 to 6 inches; ashy sandy loam
Bw1—6 to 16 inches; cobbly ashy sandy loam
Bw2—16 to 28 inches; gravelly ashy sandy loam
C1—28 to 50 inches; very gravelly loamy sand
C2—50 to 60 inches; very gravelly sand

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

192—Kartar ashy sandy loam, 15 to 45 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 1,800 to 3,500 feet
Mean annual precipitation: 16 to 18 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 100 to 120 days

Map Unit Composition

Kartar, forested, and similar soils: 100 percent

Kartar, Forested, and Similar Soils

Setting
Landform: Glacial till plains
Geomorphic position, three-dimensional: Risers
Aspect, representative: East
Aspect, range: Northwest to south (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (20 to 30 inches) over glacial till and glacial outwash
Slope: 15 to 45 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Ponderosa pine/bluebunch wheatgrass (CPG141)

Typical profile
A—0 to 6 inches; ashy sandy loam
Bw1—6 to 16 inches; cobbly ashy sandy loam
Bw2—16 to 28 inches; ashy gravelly sandy loam
C1—28 to 50 inches; very gravelly loamy sand
C2—50 to 60 inches; very gravelly sand

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

193—Kartar stony ashy sandy loam, 0 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 8—Columbia Plateau
Elevation: 1,800 to 3,500 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 100 to 120 days

Map Unit Composition

Kartar and similar soils: 100 percent

Kartar and Similar Soils

Setting
Landform: Glacial till plains
Geomorphic position, three-dimensional: Risers and treads
Aspect, representative: West
Aspect, range: South to northwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (20 to 30 inches) over glacial till and glacial outwash
Slope: 0 to 25 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 6s
Land capability classification, irrigated: 7e
Ecological site: Loamy 9-15 P.Z. (R008XY102WA)

Typical profile
A—0 to 6 inches; stony ashy sandy loam
Bw1—6 to 16 inches; cobbly ashy sandy loam
Bw2—16 to 28 inches; gravelly ashy sandy loam
C1—28 to 50 inches; very gravelly loamy sand
C2—50 to 60 inches; very gravelly sand

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

194—Kartar stony ashy sandy loam, 25 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 8—Columbia Plateau
Elevation: 1,800 to 3,500 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 100 to 120 days

Map Unit Composition

Kartar and similar soils: 100 percent

Kartar and Similar Soils

Setting
Landform: Glacial till plains
Geomorphic position, three-dimensional: Risers
Aspect, representative: South
Aspect, range: Southeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (20 to 30 inches) over glacial till and glacial outwash
Slope: 25 to 65 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Loamy 9-15 P.Z. (R008XY102WA)

Typical profile
A—0 to 6 inches; stony ashy sandy loam
Bw1—6 to 16 inches; cobbly ashy sandy loam
Bw2—16 to 28 inches; gravelly ashy sandy loam
C1—28 to 50 inches; very gravelly loamy sand
C2—50 to 60 inches; very gravelly sand

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

195—Karu gravelly ashy sandy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 5,200 to 5,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 41 degrees F
Frost-free period: 60 to 90 days

Map Unit Composition

Karu and similar soils: 85 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Karu and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes

Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 20 inches) over colluvium over glacial till
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/pinegrass (CEG310)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw—4 to 16 inches; cobbly ashy sandy loam
2C1—16 to 22 inches; very cobbly sandy loam
2C2—22 to 33 inches; very cobbly sandy loam
3C3—33 to 60 inches; very gravelly loamy sand

Named Dissimilar Minor Components

Finney soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

196—Karu stony ashy sandy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 5,000 to 5,800 feet
Mean annual precipitation: 25 to 32 inches
Mean annual air temperature: 37 to 40 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Karu and similar soils: 80 percent
Named dissimilar minor components: 15 percent
Unnamed dissimilar minor components: 5 percent

Karu and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 20 inches) over colluvium over glacial till
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/pinegrass (CEG310)

Typical profile
A—0 to 4 inches; stony ashy sandy loam
Bw—4 to 16 inches; cobbly ashy sandy loam
2C1—16 to 22 inches; very cobbly sandy loam
2C2—22 to 33 inches; very cobbly sandy loam
3C3—33 to 60 inches; very gravelly loamy sand

Named Dissimilar Minor Components

Lekrem soils
Composition: 10 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Surgh soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Summits, shoulders, and backslopes
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

197—Koepke ashy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 3,900 to 4,700 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Koepke and similar soils: 90 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 5 percent

Koepke and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (20 to 30 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately low
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A1—0 to 8 inches; ashy loam
A2—8 to 21 inches; ashy loam
A3—21 to 23 inches; ashy loam
2Bw—23 to 33 inches; cobbly sandy loam
2C—33 to 41 inches; very gravelly sandy loam
2Cd—41 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Nevine soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

198—Lani stony ashy sandy loam, 25 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 1,800 to 3,700 feet
Mean annual precipitation: 15 to 18 inches

Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 100 to 120 days

Map Unit Composition

Lani and similar soils: 100 percent

Lani and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 15 inches) over colluvium and residuum from granite, gneiss, and schist
Slope: 25 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/common snowberry (CDS636)

Typical profile
A1—0 to 8 inches; stony ashy sandy loam
A2—8 to 14 inches; ashy sandy loam
Bw—14 to 28 inches; fine sandy loam
C—28 to 60 inches; gravelly fine sandy loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

199—Leftcreek-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 1,400 to 2,500 feet
Mean annual precipitation: 12 to 18 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 110 to 140 days

Map Unit Composition

Leftcreek and similar soils: 75 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 15 percent

Leftcreek and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 20 inches) over bedrock
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A—0 to 5 inches; cobbly ashy sandy loam
Bw—5 to 14 inches; very cobbly ashy sandy loam
2R—14 to 18 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Thow soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Thowson soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Vingulch soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

200—Leiko stony ashy sandy loam, 3 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 1,390 to 3,490 feet
Mean annual precipitation: 15 to 20 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Leiko and similar soils: 85 percent
Named dissimilar minor components: 15 percent

Leiko and Similar Soils

Setting
Landform: Glacial terraces
Geomorphic position, three-dimensional: Treads and risers
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial outwash
Slope: 3 to 15 percent
Depth to restrictive feature: 10 to 30 inches to strongly contrasting textural stratification
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Land capability classification, irrigated: 6e
Plant community classification: Ponderosa pine/bitterbrush/bluebunch wheatgrass (CPS241)

Typical profile
A1—0 to 1 inch; stony ashy sandy loam
A2—1 to 9 inches; stony ashy sandy loam
2C1—9 to 29 inches; very gravelly sandy loam
2C2—29 to 60 inches; very gravelly sand

Named Dissimilar Minor Components

Kartar soils
Composition: 8 percent
Landform: Glacial till plains
Geomorphic position, three-dimensional: Risers and treads

Winthrop soils
Composition: 7 percent
Landform: Outwash terraces
Geomorphic position, three-dimensional: Treads and risers

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

201—Lekrem gravelly ashy sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,400 to 5,000 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Lekrem, moist, and similar soils: 85 percent
Named dissimilar minor components: 7 percent
Unnamed dissimilar minor components: 8 percent

Lekrem, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (12 to 25 inches) over colluvium and glacial till from granite
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 60 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw—4 to 16 inches; gravelly ashy sandy loam
2BC—16 to 29 inches; very gravelly sandy loam
2C1—29 to 40 inches; very gravelly sandy loam
2C2—40 to 60 inches; very gravelly loamy coarse sand

Named Dissimilar Minor Components

Brevco soils
Composition: 5 percent
Landform: Mountains

Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Merkel soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

202—Lekrem stony ashy sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,300 to 4,500 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Lekrem and similar soils: 85 percent
Named dissimilar minor components: 7 percent
Unnamed dissimilar minor components: 8 percent

Lekrem and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (12 to 25 inches) over colluvium and glacial till from granite
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 60 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/bitterbrush/pinegrass (CDS675)

Typical profile
A—0 to 4 inches; stony ashy sandy loam
Bw—4 to 16 inches; gravelly ashy sandy loam

2BC—16 to 29 inches; very gravelly sandy loam
2C1—29 to 40 inches; very gravelly sandy loam
2C2—40 to 60 inches; very gravelly loamy coarse sand

Named Dissimilar Minor Components

Merkel soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Brevco soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Newhorn soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

203—Lekrem-Chumstick-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,500 to 4,900 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Lekrem, moist, and similar soils: 50 percent
Chumstick, moist, and similar soils: 20 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Lekrem, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (12 to 25 inches) over colluvium and glacial till from granite

Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 60 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 4 inches; stony ashy sandy loam
Bw—4 to 16 inches; gravelly ashy sandy loam
2BC—16 to 29 inches; very gravelly sandy loam
2C1—29 to 40 inches; very gravelly sandy loam
2C2—40 to 60 inches; very gravelly loamy coarse sand

Chumstick, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (0 inches to less than 60 percent of soil depth) mixed with colluvium and residuum derived from granitic and metamorphic rocks
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 5 inches; stony ashy sandy loam
Bw—5 to 15 inches; very stony ashy sandy loam
R—15 to 19 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Brevco soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Lithic Haploxerepts
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

204—Leonardo ashy fine sandy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 5,500 to 6,500 feet
Mean annual precipitation: 35 to 40 inches
Mean annual air temperature: 39 to 41 degrees F
Frost-free period: 80 to 100 days

Map Unit Composition

Leonardo and similar soils: 100 percent

Leonardo and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (25 to 39 inches) over glacial till and colluvium
Slope: 35 to 65 percent
Depth to restrictive feature: 30 to 50 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Ponderosa pine–Douglas-fir/bluebunch wheatgrass (CDG311)

Typical profile
A1—0 to 8 inches; ashy fine sandy loam
A2—8 to 16 inches; ashy fine sandy loam
AC—16 to 38 inches; stony fine sandy loam
2C—38 to 60 inches; extremely stony sandy loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

205—Limking-Rock outcrop complex, 30 to 60 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,000 to 5,500 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 42 to 44 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Limking and similar soils: 55 percent
Rock outcrop: 20 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 15 percent

Limking and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 30 inches) over colluvium and residuum from granite
Slope: 30 to 60 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A1—0 to 4 inches; stony ashy loam
A2—4 to 6 inches; ashy loam
Bw1—6 to 13 inches; gravelly ashy loam
Bw2—13 to 22 inches; very gravelly ashy sandy loam

2BC—22 to 44 inches; extremely gravelly loamy sand
2C—44 to 58 inches; extremely gravelly loamy coarse sand
2R—58 to 62 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 30 to 60 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Wilma soils
Composition: 10 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

206—Lithic Dystrocryepts-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 5,900 to 7,200 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Lithic Dystrocryepts, forested, udic, and similar soils: 50 percent
Rock outcrop: 40 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 5 percent

Lithic Dystrocryepts, Forested, Udic, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: East
Aspect, range: Northwest to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash or mixed volcanic ash (4 to 12 inches) over colluvium and residuum
Slope: 35 to 65 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Land capability classification, irrigated: 7e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES412) and subalpine fir/grouse blueberry (huckleberry)/smooth woodrush (CES425)

Typical profile
A—0 to 4 inches; very stony ashy fine sandy loam
Bw—4 to 10 inches; very stony ashy fine sandy loam
2C—10 to 19 inches; extremely stony sandy loam
2R—19 to 29 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Devore soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

207—Lithic Eutrocryepts-Rock outcrop-Resner complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 5,200 to 7,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Lithic Eutrocryepts, forested, xeric, and similar soils: 45 percent
Rock outcrop: 25 percent
Resner and similar soils: 15 percent
Named dissimilar minor components: 12 percent
Unnamed dissimilar minor components: 3 percent

Lithic Eutrocryepts, Forested, Xeric, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash or mixed volcanic ash (4 to 12 inches) over colluvium and residuum
Slope: 15 to 35 percent
Surface area covered by rock fragments: 0.1 to 3 percent stones
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Land capability classification, irrigated: 7s
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
A—0 to 4 inches; ashy fine sandy loam
2Bw—4 to 10 inches; very stony fine sandy loam
2BC—10 to 18 inches; gravelly sandy loam
2R—18 to 22 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Resner and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (14 to 22 inches) over glacial outwash and glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 5 inches; ashy fine sandy loam
2Bw—5 to 18 inches; ashy fine sandy loam
3C—18 to 60 inches; very cobbly loamy sand

Named Dissimilar Minor Components

Manley soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases

Rubble land
Composition: 5 percent

Devore soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

208—Lithic Haploxerepts-Conconully complex, 15 to 45 percent slopes

Map Unit Setting

Major land resource area (MLRA): 8—Columbia Plateau
Elevation: 1,500 to 3,000 feet
Mean annual precipitation: 11 to 15 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 110 to 150 days

Map Unit Composition

Lithic Haploxerepts, range, dry, and similar soils: 60 percent
Conconully and similar soils: 40 percent

Lithic Haploxerepts, Range, Dry, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Southwest
Aspect, range: South to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over bedrock
Slope: 15 to 45 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Ecological site: Very Shallow 9-15 P.Z. (R008XY301WA)

Typical profile
A—0 to 3 inches; cobbly ashy sandy loam
Bw—3 to 12 inches; cobbly ashy sandy loam
2C—12 to 18 inches; very gravelly sandy loam
2R—18 to 22 inches; unweathered bedrock

Conconully and Similar Soils

Setting
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Side slopes
Aspect, representative: Southwest
Aspect, range: South to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 14 inches) over glacial till
Slope: 15 to 45 percent
Depth to restrictive feature: 26 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Ecological site: Dry Stony 9-12 P.Z., aridic (R008XY201WA)

Typical profile
A1—0 to 2 inches; extremely stony ashy loam
A2—2 to 13 inches; stony ashy loam
2Bw1—13 to 21 inches; gravelly fine sandy loam
2Bw2—21 to 33 inches; gravelly sandy loam
2Cd—33 to 60 inches; gravelly sandy loam

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

209—Lithic Haploxerepts-Donavan-Rock outcrop complex, 15 to 45 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 1,800 to 4,000 feet
Mean annual precipitation: 14 to 20 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Lithic Haploxerepts, range, dry, and similar soils: 35 percent
Donavan and similar soils: 30 percent
Rock outcrop: 20 percent
Named dissimilar minor components: 15 percent

Lithic Haploxerepts, Range, Dry, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Southwest
Aspect, range: East to northwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over bedrock
Slope: 15 to 45 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Ecological site: Very Shallow 9-15 P.Z. (R008XY301WA)

Typical profile
A—0 to 3 inches; cobbly ashy sandy loam
Bw—3 to 12 inches; cobbly ashy sandy loam
2C—12 to 18 inches; very gravelly sandy loam
2R—18 to 22 inches; unweathered bedrock

Donavan and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: Southwest
Aspect, range: East to northwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 15 inches) over glacial till
Slope: 15 to 45 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Ponderosa pine/bluebunch wheatgrass (CPG141)

Typical profile
A—0 to 6 inches; stony ashy loam
Bw1—6 to 10 inches; gravelly ashy loam
Bw2—10 to 15 inches; gravelly ashy sandy loam
2BC—15 to 26 inches; gravelly sandy loam

2Cd1—26 to 33 inches; gravelly sandy loam
2Cd2—33 to 60 inches; gravelly sandy loam

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 45 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Conconully soils
Composition: 5 percent
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Side slopes

Peka soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Molson soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Vallan soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Livestock grazing, timber production (Donavan soil), recreation, watershed, and wildlife habitat

210—Lithic Haploxerepts-Kartar complex, 15 to 45 percent slopes

Map Unit Setting

Major land resource area (MLRA): 8—Columbia Plateau
Elevation: 1,800 to 3,500 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 100 to 120 days

Map Unit Composition

Lithic Haploxerepts, range, dry, and similar soils: 60 percent
Kartar and similar soils: 40 percent

Lithic Haploxerepts, Range, Dry, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Aspect, representative: Southwest
Aspect, range: Southeast to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over bedrock
Slope: 15 to 45 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Ecological site: Very Shallow 9-15 P.Z. (R008XY301WA)

Typical profile
A—0 to 3 inches; cobbly ashy sandy loam
Bw—3 to 12 inches; cobbly ashy sandy loam
2C—12 to 18 inches; very gravelly sandy loam
2R—18 to 22 inches; unweathered bedrock

Kartar and Similar Soils

Setting
Landform: Glacial till plains
Geomorphic position, three-dimensional: Risers
Aspect, representative: Southwest
Aspect, range: Southeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (20 to 30 inches) over glacial till and glacial outwash
Slope: 15 to 45 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Ecological site: Stony 9-15 P.Z. (R008XY202WA)

Typical profile
A—0 to 6 inches; stony ashy sandy loam
Bw1—6 to 16 inches; cobbly ashy sandy loam
Bw2—16 to 28 inches; gravelly ashy sandy loam
C1—28 to 50 inches; very gravelly loamy sand
C2—50 to 60 inches; very gravelly sand

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

211—Lithic Haploxerepts-Newbon complex, 15 to 45 percent slopes

Map Unit Setting

Major land resource area (MLRA): 8—Columbia Plateau
Elevation: 1,800 to 3,000 feet
Mean annual precipitation: 11 to 15 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 130 to 150 days

Map Unit Composition

Lithic Haploxerepts, range, dry, and similar soils: 60 percent
Newbon and similar soils: 40 percent

Lithic Haploxerepts, Range, Dry, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: East
Aspect, range: North to south (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over bedrock
Slope: 15 to 45 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Ecological site: Very Shallow 9-15 P.Z. (R008XY301WA)

Typical profile
A—0 to 3 inches; cobbly ashy sandy loam
Bw—3 to 12 inches; cobbly ashy sandy loam
2C—12 to 18 inches; very gravelly sandy loam
2R—18 to 22 inches; unweathered bedrock

Newbon and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: East
Aspect, range: North to south (clockwise)

Properties and qualities
Parent material: Glacial till
Slope: 15 to 45 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained

Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Ecological site: Loamy 9-15 P.Z. (R008XY102WA)

Typical profile
A1—0 to 2 inches; stony loam
A2—2 to 13 inches; gravelly loam
Bw—13 to 25 inches; gravelly loam
C—25 to 60 inches; very gravelly loam

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

212—Lithic Haploxerepts-Rock outcrop complex, 15 to 90 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 1,600 to 4,000 feet
Mean annual precipitation: 12 to 18 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 110 to 140 days

Map Unit Composition

Lithic Haploxerepts, range, moist, and similar soils: 55 percent
Rock outcrop: 30 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Lithic Haploxerepts, Range, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over bedrock
Slope: 15 to 90 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A—0 to 3 inches; cobbly ashy sandy loam
Bw—3 to 12 inches; cobbly ashy sandy loam
2C—12 to 18 inches; very gravelly sandy loam
2R—18 to 22 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 90 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Thout soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Wynhoff soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

213—Lithic Haploxerepts-Wapal-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,500 to 4,300 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 40 to 46 degrees F
Frost-free period: 95 to 120 days

Map Unit Composition

Lithic Haploxerepts, forested, dry, and similar soils: 40 percent
Wapal, dry, and similar soils: 35 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 10 percent

Lithic Haploxerepts, Forested, Dry, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over bedrock
Slope: 35 to 65 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Plant community classification: Douglas-fir/bitterbrush/pinegrass (CDS675)

Typical profile
A—0 to 3 inches; very stony ashy sandy loam
Bw—3 to 12 inches; cobbly ashy sandy loam
2C—12 to 18 inches; very gravelly sandy loam
2R—18 to 22 inches; unweathered bedrock

Wapal, Dry, and Similar Soils

Setting
Landform: Outwash terraces
Geomorphic position, three-dimensional: Risers
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial outwash
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/bitterbrush/pinegrass (CDS675)

Typical profile
A—0 to 4 inches; very stony ashy coarse sandy loam
Bw—4 to 11 inches; very gravelly ashy coarse sandy loam
2C1—11 to 32 inches; extremely cobbly loamy coarse sand
2C2—32 to 60 inches; very gravelly loamy coarse sand

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Pebcreek soils
Composition: 5 percent
Landform: Mountains

Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Rubble land
Composition: 3 percent

Doe soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

214—Lithic Haploxerepts-Wilma-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 2,600 to 5,300 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Lithic Haploxerepts, forested, moist, and similar soils: 35 percent
Wilma, dry, and similar soils: 25 percent
Rock outcrop: 25 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Lithic Haploxerepts, Forested, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over bedrock
Slope: 35 to 65 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s

Plant community classification: Douglas-fir/pinegrass (CDG131) and Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 3 inches; cobbly ashy sandy loam
Bw—3 to 12 inches; cobbly ashy sandy loam
2C—12 to 18 inches; very gravelly sandy loam
2R—18 to 22 inches; unweathered bedrock

Wilma, Dry, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (10 to 14 inches) over colluvium and residuum from metavolcanics and granite
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass–bluebunch wheatgrass (CDG134) and Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 6 inches; stony ashy fine sandy loam
Bw—6 to 12 inches; gravelly ashy fine sandy loam
2BC—12 to 17 inches; very cobbly fine sandy loam
2C—17 to 28 inches; extremely gravelly coarse sandy loam
2R—28 to 32 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Merkel soils
Composition: 10 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

215—Longort gravelly ashy sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,700 to 4,900 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Longort and similar soils: 85 percent
Named dissimilar minor components: 12 percent
Unnamed dissimilar minor components: 3 percent

Longort and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 17 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 25 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 5 inches; gravelly ashy sandy loam
Bw—5 to 17 inches; gravelly ashy sandy loam
2C—17 to 37 inches; very gravelly sandy loam
2Cd1—37 to 47 inches; very gravelly sandy loam
2Cd2—47 to 60 inches; very cobbly sandy loam

Named Dissimilar Minor Components

Nicmar soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Santop soils
Composition: 5 percent
Landform: Mountains

Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Winsand soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

216—Longort gravelly ashy sandy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,800 to 4,900 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Longort and similar soils: 80 percent
Named dissimilar minor components: 15 percent
Unnamed dissimilar minor components: 5 percent

Longort and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 17 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 60 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 5 inches; gravelly ashy sandy loam
Bw—5 to 17 inches; gravelly ashy sandy loam
2C—17 to 37 inches; very gravelly sandy loam
2Cd1—37 to 47 inches; very gravelly sandy loam
2Cd2—47 to 60 inches; very cobbly sandy loam

Named Dissimilar Minor Components

Nicmar soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Santop soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Gatewall soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Winsand soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

217—Longort-Santop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,600 to 3,900 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Longort and similar soils: 60 percent
Santop and similar soils: 25 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Longort and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 17 inches) over glacial till

Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 60 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 5 inches; gravelly ashy sandy loam
Bw—5 to 17 inches; gravelly ashy sandy loam
2C—17 to 37 inches; very gravelly sandy loam
2Cd1—37 to 47 inches; very gravelly sandy loam
2Cd2—47 to 60 inches; very cobbly sandy loam

Santop and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 18 inches) over colluvium and residuum from volcanic and sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 5 inches; gravelly ashy sandy loam
Bw—5 to 15 inches; very gravelly ashy sandy loam
2C—15 to 34 inches; extremely stony sandy loam
2R—34 to 38 inches; unweathered bedrock

Named Dissimilar Minor Components

Rock outcrop
Composition: 5 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

218—Longswamp ashy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,600 to 4,800 feet
Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 85 to 120 days

Map Unit Composition

Longswamp, cool, and similar soils: 80 percent
Named dissimilar minor components: 20 percent

Longswamp, Cool, and Similar Soils

Setting
Landform: Gently sloping side slopes on drainageways; on mountains
Geomorphic position, two-dimensional: Footslopes
Geomorphic position, three-dimensional: Mountainbases
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (12 to 20 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 25 to 40 inches to dense material
Drainage class: Moderately well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately low
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: 25 to 40 inches (See Water Features table.)
Available water capacity, entire profile: Moderate (about 6.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Quaking aspen/common snowberry, riparian (HQS221)

Typical profile
A1—0 to 6 inches; ashy loam
A2—6 to 12 inches; ashy loam
Bw—12 to 15 inches; cobbly ashy sandy loam
2C—15 to 25 inches; very gravelly sandy loam
2Cd1—25 to 36 inches; very gravelly sandy loam
2Cd2—36 to 60 inches; gravelly clay loam

Named Dissimilar Minor Components

Aquandic Endoaquolls
Composition: 5 percent
Landform: Bottoms of drainageways on bottoms of basin floors; bottoms of drainageways on bottoms of valley floors
Geomorphic position, two-dimensional: Toeslopes
Geomorphic position, three-dimensional: Dips, rises, and talfs

Bearspring soils
Composition: 5 percent
Landform: Mountains

Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Wynhoff soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Oxerine soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops

Merkel soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

219—Louploup-Stepstone complex, 3 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 3,000 to 4,000 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Louploup, cool, and similar soils: 55 percent
Stepstone and similar soils: 35 percent
Named dissimilar minor components: 10 percent

Louploup, Cool, and Similar Soils

Setting
Landform: Glacial till plains
Geomorphic position, three-dimensional: Treads
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (14 to 30 inches) over glacial till
Slope: 3 to 15 percent
Depth to restrictive feature: 40 to 50 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None

Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 3e
Plant community classification: Douglas-fir/dwarf huckleberry (CDS831 and CDS813)

Typical profile
A—0 to 6 inches; ashy fine sandy loam
Bw—6 to 21 inches; ashy fine sandy loam
2CB—21 to 41 inches; gravelly sandy loam
2Cd—41 to 60 inches; gravelly sandy loam

Stepstone and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (10 to 24 inches) over glacial till from granite
Slope: 3 to 15 percent
Depth to restrictive feature: 14 to 36 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 3e
Plant community classification: Douglas-fir/dwarf huckleberry (CDS813 and CDS831)

Typical profile
A—0 to 1 inch; ashy fine sandy loam
Bw1—1 to 5 inches; ashy fine sandy loam
Bw2—5 to 18 inches; ashy fine sandy loam
2CB—18 to 22 inches; very gravelly sandy loam
2C1—22 to 38 inches; very gravelly loamy sand
2C2—38 to 60 inches; very gravelly loamy sand

Named Dissimilar Minor Components

Stapaloop soils
Composition: 4 percent
Landform: Terraces on mountains
Geomorphic position, two-dimensional: Toeslopes and footslopes
Geomorphic position, three-dimensional: Mountainbases, the lower third of mountainflanks, treads, and risers

Torboy soils
Composition: 4 percent
Landform: Glacial terraces
Geomorphic position, three-dimensional: Treads and risers

Nevine soils
Composition: 2 percent
Landform: Glacial moraines

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

220—Louploup-Stepstone complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 3,000 to 4,000 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Louploup, dry, and similar soils: 50 percent
Stepstone, dry, and similar soils: 35 percent
Named dissimilar minor components: 15 percent

Louploup, Dry, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases
Aspect, representative: North
Aspect, range: Southwest to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 30 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 40 to 50 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 6 inches; ashy fine sandy loam
Bw—6 to 21 inches; ashy fine sandy loam
2CB—21 to 41 inches; gravelly sandy loam
2Cd—41 to 60 inches; gravelly sandy loam

Stepstone, Dry, and Similar Soils

Setting
Landform: Mountains

Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: North
Aspect, range: Southwest to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 24 inches) over glacial till from granite
Slope: 15 to 35 percent
Depth to restrictive feature: 14 to 36 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 1 inch; ashy fine sandy loam
Bw1—1 to 5 inches; ashy fine sandy loam
Bw2—5 to 18 inches; ashy fine sandy loam
2CB—18 to 22 inches; very gravelly sandy loam
2C1—22 to 38 inches; very gravelly loamy sand
2C2—38 to 60 inches; very gravelly loamy sand

Named Dissimilar Minor Components

Stapaloop soils
Composition: 5 percent
Landform: Terraces on mountains
Geomorphic position, two-dimensional: Toeslopes and footslopes
Geomorphic position, three-dimensional: Mountainbases, the lower third of mountainflanks, treads, and risers

Torboy soils
Composition: 5 percent
Landform: Glacial terraces
Geomorphic position, three-dimensional: Treads and risers

Nevine soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

221—Manley ashy fine sandy loam, 0 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 4,200 to 4,600 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Manley and similar soils: 85 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Manley and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (14 to 25 inches) over glacial till
Slope: 0 to 15 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/twinflower (CEF211 and CEF222)

Typical profile
C—0 to 2 inches; ashy fine sandy loam
2Bw1—2 to 13 inches; ashy fine sandy loam
2Bw2—13 to 21 inches; ashy fine sandy loam
3C—21 to 34 inches; very cobbly sandy loam
3Cd—34 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Resner soils
Composition: 5 percent
Landform: Depressions on outwash terraces on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, the lower third of mountainflanks, treads, and risers

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

222—Manley ashy fine sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 4,200 to 5,100 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Manley and similar soils: 80 percent
Named dissimilar minor components: 16 percent
Unnamed dissimilar minor components: 4 percent

Manley and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases
Aspect, representative: North
Aspect, range: Southwest to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 25 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/twinflower (CEF222 and CEF211)

Typical profile
C—0 to 2 inches; ashy fine sandy loam
2Bw1—2 to 13 inches; ashy fine sandy loam
2Bw2—13 to 21 inches; ashy fine sandy loam
3C—21 to 34 inches; very cobbly sandy loam
3Cd—34 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Devore soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Resner soils
Composition: 5 percent
Landform: Outwash terraces on mountains

Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, the lower third of mountainflanks, and risers

Myerscreek soils
Composition: 2 percent
Landform: Glacial moraines on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainflanks

Nevine soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

223—Manley-Devore complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 4,500 to 5,400 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Manley, warm, and similar soils: 60 percent
Devore, warm, and similar soils: 25 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Manley, Warm, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 25 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None

Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
C—0 to 2 inches; ashy fine sandy loam
2Bw1—2 to 13 inches; ashy fine sandy loam
2Bw2—13 to 21 inches; ashy fine sandy loam
3C—21 to 34 inches; very cobbly sandy loam
3Cd—34 to 60 inches; very gravelly sandy loam

Devore, Warm, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metamorphic rock
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
C—0 to 1 inch; stony ashy fine sandy loam
2A—1 to 4 inches; very stony ashy fine sandy loam
2Bw—4 to 11 inches; very stony ashy fine sandy loam
3C1—11 to 23 inches; extremely stony coarse sandy loam
3C2—23 to 32 inches; extremely stony coarse sandy loam
3R—32 to 36 inches; unweathered bedrock

Named Dissimilar Minor Components

Resner soils
Composition: 3 percent
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, the lower third of mountainflanks, treads, and risers

Treebutte soils
Composition: 3 percent

Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops

Nevine soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

224—Manley-Devore complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 4,700 to 5,500 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Manley, warm, and similar soils: 60 percent
Devore, warm, and similar soils: 25 percent
Named dissimilar minor components: 7 percent
Unnamed dissimilar minor components: 8 percent

Manley, Warm, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 25 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
C—0 to 2 inches; ashy fine sandy loam
2Bw1—2 to 13 inches; ashy fine sandy loam
2Bw2—13 to 21 inches; ashy fine sandy loam
3C—21 to 34 inches; very cobbly sandy loam
3Cd—34 to 60 inches; very gravelly sandy loam

Devore, Warm, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metamorphic rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
C—0 to 1 inch; stony ashy fine sandy loam
2A—1 to 4 inches; very stony ashy fine sandy loam
2Bw—4 to 11 inches; very stony ashy fine sandy loam
3C1—11 to 23 inches; extremely stony coarse sandy loam
3C2—23 to 32 inches; extremely stony coarse sandy loam
3R—32 to 36 inches; unweathered bedrock

Named Dissimilar Minor Components

Nevine soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

225—Martella ashy fine sandy loam, 0 to 20 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 3,400 to 4,800 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Martella and similar soils: 85 percent
Named dissimilar minor components: 13 percent
Unnamed dissimilar minor components: 2 percent

Martella and Similar Soils

Setting
Landform: Glacial lake terraces
Geomorphic position, three-dimensional: Treads
Aspect, representative: Northwest
Aspect, range: South to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glaciolacustrine deposits
Slope: 0 to 20 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: 24 to 30 inches (See Water Features table.)
Available water capacity, entire profile: High (about 11.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/dwarf huckleberry (CDS831)

Typical profile
A—0 to 5 inches; ashy fine sandy loam
Bw—5 to 13 inches; ashy fine sandy loam
2E/Bt—13 to 22 inches; silt loam
2Bt—22 to 43 inches; silt loam
2C—43 to 60 inches; stratified very fine sandy loam

Named Dissimilar Minor Components

Goddard soils
Composition: 5 percent
Landform: Outwash terraces
Geomorphic position, three-dimensional: Risers and treads

Stapaloop soils
Composition: 5 percent
Landform: Terraces on mountains
Geomorphic position, two-dimensional: Toeslopes and footslopes

Geomorphic position, three-dimensional: Mountainbases, the lower third of mountainflanks, treads, and risers

Louploup soils
Composition: 3 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

226—McCay gravelly ashy sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 6,000 to 7,000 feet
Mean annual precipitation: 35 to 45 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 80 days

Map Unit Composition

McCay and similar soils: 85 percent
Unnamed dissimilar minor components: 15 percent

McCay and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: West
Aspect, range: South to north (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium from granite
Slope: 15 to 35 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/Cascade azalea (CES214)

Typical profile
C—0 to 1 inch; ashy fine sandy loam
2Bw1—1 to 4 inches; gravelly ashy sandy loam
2Bw2—4 to 13 inches; gravelly ashy sandy loam
3BC—13 to 24 inches; very gravelly sandy loam
3C—24 to 45 inches; very gravelly sandy loam
3Cr—45 to 55 inches; weathered bedrock

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

227—McCay-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 6,000 to 7,000 feet
Mean annual precipitation: 35 to 45 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 80 days

Map Unit Composition

McCay and similar soils: 70 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

McCay and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium from granite
Slope: 35 to 65 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/Cascade azalea (CES214)

Typical profile
C—0 to 1 inch; ashy fine sandy loam
2Bw1—1 to 4 inches; gravelly ashy sandy loam
2Bw2—4 to 13 inches; gravelly ashy sandy loam
3BC—13 to 24 inches; very gravelly sandy loam
3C—24 to 45 inches; very gravelly sandy loam
3Cr—45 to 55 inches; weathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Devore soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

228—Merkel ashy sandy loam, 5 to 20 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,800 to 4,900 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Merkel and similar soils: 100 percent

Merkel and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes and footslopes
Geomorphic position, three-dimensional: Mountainbases
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 30 inches) over glacial till from granite
Slope: 5 to 20 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately low
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Land capability classification, irrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 6 inches; ashy sandy loam
Bw1—6 to 12 inches; gravelly ashy sandy loam
Bw2—12 to 29 inches; gravelly ashy sandy loam
2CB—29 to 35 inches; very gravelly sandy loam
2Cd—35 to 60 inches; very gravelly coarse sandy loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

229—Merkel ashy sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 3,400 to 4,700 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Merkel and similar soils: 80 percent
Named dissimilar minor components: 15 percent
Unnamed dissimilar minor components: 5 percent

Merkel and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes, toeslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 30 inches) over glacial till from granite
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 4 inches; ashy sandy loam
Bw1—4 to 8 inches; cobbly ashy sandy loam
Bw2—8 to 13 inches; very cobbly ashy sandy loam
2CB—13 to 21 inches; extremely cobbly sandy loam
2Cd1—21 to 38 inches; extremely gravelly sandy loam
2Cd2—38 to 60 inches; extremely cobbly loamy sand

Named Dissimilar Minor Components

Nevine soils
Composition: 5 percent

Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Newhorn soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Wapal soils
Composition: 5 percent
Landform: Outwash terraces
Geomorphic position, three-dimensional: Treads and risers

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

230—Merkel cobbly ashy sandy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 4,200 to 5,100 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Merkel and similar soils: 85 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Merkel and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Lower and center thirds of mountainflanks
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 30 inches) over glacial till from granite
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 4 inches; cobbly ashy sandy loam
Bw1—4 to 8 inches; cobbly ashy sandy loam
Bw2—8 to 13 inches; very cobbly ashy sandy loam
2CB—13 to 21 inches; extremely cobbly sandy loam
2Cd1—21 to 38 inches; extremely gravelly sandy loam
2Cd2—38 to 60 inches; extremely cobbly loamy sand

Named Dissimilar Minor Components

Brevco soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Newhorn soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

231—Merkel-Lithic Haploxerepts-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 2,800 to 4,200 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Merkel and similar soils: 40 percent
Lithic Haploxerepts, forested, moist, and similar soils: 25 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 8 percent
Unnamed dissimilar minor components: 12 percent

Merkel and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (10 to 30 inches) over glacial till from granite
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
C—0 to 1 inch; stony ashy silt loam
2A—1 to 4 inches; very stony ashy fine sandy loam
2Bw—4 to 11 inches; very stony ashy fine sandy loam
3C1—11 to 23 inches; extremely stony coarse sandy loam
3C2—23 to 32 inches; extremely stony coarse sandy loam
3R—32 to 36 inches; unweathered bedrock

Lithic Haploxerepts, Forested, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over bedrock
Slope: 15 to 35 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655) and Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 3 inches; cobbly ashy sandy loam
Bw—3 to 12 inches; cobbly ashy sandy loam
2C—12 to 18 inches; very gravelly sandy loam
2R—18 to 22 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Nevine soils
Composition: 4 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Stepstone soils
Composition: 4 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

232—Merkel-Wilma complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 3,900 to 4,800 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Merkel and similar soils: 60 percent
Wilma and similar soils: 25 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Merkel and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Lower and center thirds of mountainflanks
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 30 inches) over glacial till from granite
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 4 inches; cobbly ashy sandy loam
Bw1—4 to 8 inches; cobbly ashy sandy loam
Bw2—8 to 13 inches; very cobbly ashy sandy loam
2CB—13 to 21 inches; extremely cobbly sandy loam
2Cd1—21 to 38 inches; extremely gravelly sandy loam
2Cd2—38 to 60 inches; extremely cobbly loamy sand

Wilma and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 14 inches) over colluvium and residuum from metavolcanics and granite
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 6 inches; stony ashy fine sandy loam
Bw—6 to 12 inches; gravelly ashy fine sandy loam
2BC—12 to 17 inches; very cobbly fine sandy loam
2C—17 to 28 inches; extremely gravelly coarse sandy loam
2R—28 to 32 inches; unweathered bedrock

Named Dissimilar Minor Components

Lithic Haploxerepts
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Rock outcrop
Composition: 5 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

233—Midpeak-Johntom-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,000 to 4,750 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 40 to 50 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Midpeak and similar soils: 45 percent
Johntom and similar soils: 35 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 7 percent
Unnamed dissimilar minor components: 3 percent

Midpeak and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 15 inches) over colluvium and residuum from volcanic rock and sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A1—0 to 6 inches; gravelly ashy sandy loam
A2—6 to 15 inches; very gravelly ashy sandy loam
2Bw—15 to 23 inches; very gravelly sandy loam
2C—23 to 36 inches; extremely gravelly sandy loam
2R—36 to 41 inches; unweathered bedrock

Johntom and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Colluvium and residuum from mixed volcanic and sedimentary rocks
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 3 inches; gravelly loam
A2—3 to 12 inches; very flaggy loam
R—12 to 16 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Longort soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Volmont soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Summits, shoulders, and backslopes
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, timber production (Midpeak soil), recreation, watershed, and wildlife habitat

234—Mineral-Rock outcrop complex, 20 to 40 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,500 to 5,500 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 105 to 130 days

Map Unit Composition

Mineral and similar soils: 60 percent
Rock outcrop: 20 percent
Named dissimilar minor components: 15 percent
Unnamed dissimilar minor components: 5 percent

Mineral and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium and residuum from granite and metamorphic rock
Slope: 20 to 40 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/pinegrass (CDG131) and Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 6 inches; stony ashy loam
Bw—6 to 12 inches; very gravelly ashy loam
2C—12 to 23 inches; very stony sandy loam
2R—23 to 27 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 20 to 40 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Bearspring soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Lani soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Vanbrunt soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

235—Molson ashy silt loam, 25 to 40 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 1,900 to 4,500 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 95 to 130 days

Map Unit Composition

Molson and similar soils: 100 percent

Molson and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 20 inches) over glacial till
Slope: 25 to 40 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: High (about 10.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Ecological site: Cool Loamy 15+ P.Z. (R043AY103WA)

Typical profile
Ap—0 to 8 inches; ashy silt loam
A—8 to 18 inches; ashy silt loam
2Bw—18 to 42 inches; gravelly silt loam
2C1—42 to 50 inches; gravelly silt loam
2C2—50 to 60 inches; gravelly silt loam

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

236—Muckamuck silt loam, 0 to 3 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 1,400 to 2,500 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 100 to 125 days

Map Unit Composition

Muckamuck and similar soils: 100 percent

Muckamuck and Similar Soils

Setting
Landform: Low stream terraces on alluvial flats
Geomorphic position, three-dimensional: Mountainbases and treads
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Alluvium
Slope: 0 to 3 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: Occasional (See Water Features table.)
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: High (about 10.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 3w
Land capability classification, irrigated: 3w
Plant community classification: Ponderosa pine/pinegrass-bluebunch wheatgrass (CPG231)

Typical profile
Ap—0 to 7 inches; silt loam
BA—7 to 18 inches; silt loam
Bw—18 to 29 inches; silty clay loam
C—29 to 60 inches; gravelly loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

237—Myerscreek ashy fine sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 4,600 to 5,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Myerscreek, cool, and similar soils: 85 percent
Named dissimilar minor components: 8 percent
Unnamed dissimilar minor components: 7 percent

Myerscreek, Cool, and Similar Soils

Setting
Landform: Mountains

Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 35 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES412) and subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
C—0 to 1 inch; ashy fine sandy loam
2A—1 to 4 inches; ashy fine sandy loam
2Bw—4 to 12 inches; ashy fine sandy loam
3CB—12 to 31 inches; very gravelly sandy loam
3Cd1—31 to 46 inches; very gravelly sandy loam
3Cd2—46 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Manley soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases

Sitdown soils
Composition: 3 percent
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, risers, and treads

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

238—Myerscreek ashy fine sandy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 5,200 to 5,800 feet

Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Myerscreek, moist, and similar soils: 85 percent
Named dissimilar minor components: 8 percent
Unnamed dissimilar minor components: 7 percent

Myerscreek, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Northwest
Aspect, range: Southwest to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 35 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/twinflower (CEF222)

Typical profile
C—0 to 1 inch; ashy fine sandy loam
2A—1 to 4 inches; stony ashy fine sandy loam
2Bw—4 to 12 inches; ashy fine sandy loam
3CB—12 to 31 inches; very gravelly sandy loam
3Cd1—31 to 46 inches; very gravelly sandy loam
3Cd2—46 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Sitdown soils
Composition: 5 percent
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, risers, and treads

Manley soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

239—Myerscreek stony ashy fine sandy loam, 5 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 5,500 to 6,600 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Myerscreek, cool, and similar soils: 85 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Myerscreek, Cool, and Similar Soils

Setting
Landform: Glently sloping to steep, morainic mountain valleys
Geomorphic position, two-dimensional: Backslopes, footslopes, and toeslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases
Aspect, representative: East
Aspect, range: North to south (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 5 to 35 percent
Depth to restrictive feature: 20 to 35 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
C—0 to 1 inch; stony ashy fine sandy loam
2A—1 to 4 inches; stony ashy fine sandy loam
2Bw—4 to 12 inches; ashy fine sandy loam
3CB—12 to 31 inches; very gravelly sandy loam
3Cd1—31 to 46 inches; very gravelly sandy loam
3Cd2—46 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Devore soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Sitdown soils
Composition: 3 percent
Landform: Outwash terraces on mountains

Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, treads, and risers

Manley soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

240—Myerscreek stony ashy fine sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,750 to 5,500 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Myerscreek, warm, and similar soils: 85 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Myerscreek, Warm, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 35 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry)/pinegrass (CES413)

Typical profile
C—0 to 1 inch; stony ashy fine sandy loam
2A—1 to 4 inches; stony ashy fine sandy loam

2Bw—4 to 12 inches; ashy fine sandy loam
3CB—12 to 31 inches; very gravelly sandy loam
3Cd1—31 to 46 inches; very gravelly sandy loam
3Cd2—46 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Devore soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Sitdown soils
Composition: 5 percent
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, treads, and risers

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

241—Myerscreek stony ashy fine sandy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 5,300 to 6,400 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Myerscreek, warm, and similar soils: 85 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Myerscreek, Warm, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 35 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None

Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry)/pinegrass (CES413)

Typical profile
C—0 to 1 inch; stony ashy fine sandy loam
2A—1 to 4 inches; stony ashy fine sandy loam
2Bw—4 to 12 inches; ashy fine sandy loam
3CB—12 to 31 inches; very gravelly sandy loam
3Cd1—31 to 46 inches; very gravelly sandy loam
3Cd2—46 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Manley soils
Composition: 4 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases

Sitdown soils
Composition: 4 percent
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, risers, and treads

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

242—Myerscreek stony ashy fine sandy loam, warm, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,100 to 5,500 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Myerscreek and similar soils: 85 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Myerscreek and Similar Soils

Setting
Landform: Mountains

Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 35 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES342)

Typical profile
C—0 to 1 inch; stony ashy fine sandy loam
2A—1 to 4 inches; stony ashy fine sandy loam
2Bw—4 to 12 inches; ashy fine sandy loam
3CB—12 to 31 inches; very gravelly sandy loam
3Cd1—31 to 46 inches; very gravelly sandy loam
3Cd2—46 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Devore soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Manley soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

243—Myerscreek-Aquic Dystrocryepts complex, 0 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 5,000 to 6,500 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Myerscreek, cool, and similar soils: 55 percent
Aquic Dystrocryepts, udic, forested, and similar soils: 30 percent
Named dissimilar minor components: 8 percent
Unnamed dissimilar minor components: 7 percent

Myerscreek, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 15 to 25 percent
Depth to restrictive feature: 20 to 35 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES412) and subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; stony ashy fine sandy loam
2Bw—4 to 12 inches; ashy fine sandy loam
3CB—12 to 31 inches; very gravelly sandy loam
3Cd1—31 to 46 inches; very gravelly sandy loam
3Cd2—46 to 60 inches; very gravelly sandy loam

Aquic Dystrocryepts, Udic, Forested, and Similar Soils

Setting
Landform: Depressions in mountains, depressions in glacial-trough valleys, depressions in bottoms of drainageways
Geomorphic position, two-dimensional: Footslopes and toeslopes
Geomorphic position, three-dimensional: Mountainbases, dips, rises, and talfs
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (7 to 11 inches) over glacial till and alluvium
Slope: 0 to 15 percent
Depth to restrictive feature: 20 to 60 inches to dense material
Drainage class: Somewhat poorly drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None

Seasonal high water table, minimum depth: 18 to 34 inches (See Water Features table.)
Available water capacity, entire profile: Low (about 5.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 6w
Plant community classification: Subalpine fir series, wetland (CEW0)

Typical profile
A—0 to 6 inches; ashy fine sandy loam
AB—6 to 11 inches; ashy sandy loam
2Bw1—11 to 28 inches; gravelly sandy loam
2Bw2—28 to 34 inches; very gravelly sandy loam
2Cd—34 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Sitdown soils
Composition: 5 percent
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, treads, and risers

Haplosaprists
Composition: 3 percent
Landform: Bottoms of drainageways in valleys on mountains; bottoms of basin floors in valleys on mountains
Geomorphic position, two-dimensional: Toeslopes
Geomorphic position, three-dimensional: Mountainbases

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

244—Myerscreek-Devore complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,800 to 6,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Myerscreek, cool, and similar soils: 55 percent
Devore, cool, and similar soils: 25 percent
Named dissimilar minor components: 15 percent
Unnamed dissimilar minor components: 5 percent

Myerscreek, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainflanks

Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 31 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; stony ashy fine sandy loam
2Bw—4 to 12 inches; ashy fine sandy loam
3CB—12 to 31 inches; very gravelly sandy loam
3Cd1—31 to 46 inches; very gravelly sandy loam
3Cd2—46 to 60 inches; very gravelly sandy loam

Devore, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metamorphic rock
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
C—0 to 1 inch; stony ashy sandy loam
2A—1 to 4 inches; very stony ashy fine sandy loam
2Bw—4 to 11 inches; very stony ashy fine sandy loam
3C1—11 to 23 inches; extremely stony coarse sandy loam
3C2—23 to 32 inches; extremely stony coarse sandy loam
3R—32 to 36 inches; unweathered bedrock

Named Dissimilar Minor Components

Manley soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases

Sitdown soils
Composition: 5 percent
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, risers, and treads

Treebutte soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

245—Myerscreek-Devore complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,800 to 6,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Myerscreek, cool, and similar soils: 55 percent
Devore, cool, and similar soils: 25 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 10 percent

Myerscreek, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 35 inches to dense material

Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; stony ashy fine sandy loam
2Bw—4 to 12 inches; ashy fine sandy loam
3CB—12 to 31 inches; very gravelly sandy loam
3Cd1—31 to 46 inches; very gravelly sandy loam
3Cd2—46 to 60 inches; very gravelly sandy loam

Devore, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metamorphic rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
C—0 to 1 inch; stony ashy sandy loam
2A—1 to 4 inches; very stony ashy fine sandy loam
2Bw—4 to 11 inches; very stony ashy fine sandy loam
3C1—11 to 23 inches; extremely stony coarse sandy loam
3C2—23 to 32 inches; extremely stony coarse sandy loam
3R—32 to 36 inches; unweathered bedrock

Named Dissimilar Minor Components

Sitdown soils
Composition: 5 percent
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Footslopes and backslopes

Geomorphic position, three-dimensional: Mountainbases, mountainflanks, risers, and treads

Treebutte soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

246—Myerscreek-Devore complex, warm, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,900 to 5,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Myerscreek and similar soils: 55 percent
Devore, cool, and similar soils: 30 percent
Named dissimilar minor components: 15 percent

Myerscreek and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Northeast
Aspect, range: Northwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 35 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES342)

Typical profile
C—0 to 1 inch; ashy silt loam

2A—1 to 4 inches; stony ashy fine sandy loam
2Bw—4 to 12 inches; ashy fine sandy loam
3CB—12 to 31 inches; very gravelly sandy loam
3Cd1—31 to 46 inches; very gravelly sandy loam
3Cd2—46 to 60 inches; very gravelly sandy loam

Devore, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: Northeast
Aspect, range: Northwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metamorphic rock
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
C—0 to 1 inch; stony ashy sandy loam
2A—1 to 4 inches; very stony ashy fine sandy loam
2Bw—4 to 11 inches; very stony ashy fine sandy loam
3C1—11 to 23 inches; extremely stony coarse sandy loam
3C2—23 to 32 inches; extremely stony coarse sandy loam
3R—32 to 36 inches; unweathered bedrock

Named Dissimilar Minor Components

Manley soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases

Rock outcrop
Composition: 5 percent

Treebutte soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

247—Myerscreek-Finney complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,400 to 5,600 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Myerscreek, moist, and similar soils: 55 percent
Finney and similar soils: 30 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Myerscreek, Moist, and Similar Soils

Setting
Landform: Mountains, escarpments, terraces, side slopes, and drainageways
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks, mountainbases, and risers
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 35 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/twinflower (CEF222)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; ashy fine sandy loam
2Bw—4 to 12 inches; ashy fine sandy loam
3CB—12 to 31 inches; very gravelly sandy loam
3Cd1—31 to 46 inches; very gravelly sandy loam
3Cd2—46 to 60 inches; very gravelly sandy loam

Finney and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metasedimentary rock

Slope: 35 to 65 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/twinflower (CEF222)

Typical profile
A—0 to 2 inches; gravelly ashy sandy loam
Bw—2 to 10 inches; gravelly ashy sandy loam
2C1—10 to 20 inches; very gravelly sandy loam
2C2—20 to 32 inches; very gravelly sandy loam
3C3—32 to 43 inches; very gravelly sandy loam
3R—43 to 47 inches; unweathered bedrock

Named Dissimilar Minor Components

Manley soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

248—Myerscreek-Histic Cryaquepts-Cryohemists complex, 0 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 5,300 to 6,500 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 60 to 80 days

Map Unit Composition

Myerscreek, cool, and similar soils: 40 percent
Histic Cryaquepts and similar soils: 30 percent
Cryohemists and similar soils: 30 percent

Myerscreek, Cool, and Similar Soils

Setting
Landform: Mountains and the higher positions of bottoms in mountain valleys
Geomorphic position, two-dimensional: Backslopes, footslopes, and toeslopes
Geomorphic position, three-dimensional: Mountainbases
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 3 to 15 percent
Depth to restrictive feature: 20 to 35 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; stony ashy fine sandy loam
2Bw—4 to 12 inches; ashy fine sandy loam
3CB—12 to 31 inches; very gravelly sandy loam
3Cd1—31 to 46 inches; very gravelly sandy loam
3Cd2—46 to 60 inches; very gravelly sandy loam

Histic Cryaquepts and Similar Soils

Setting
Landform: Nearly level valley floors on mountains
Geomorphic position, two-dimensional: Footslopes and toeslopes
Geomorphic position, three-dimensional: Mountainbases, dips, rises, and talfs
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Organic soil material over alluvium and glacial till
Slope: 0 to 10 percent
Depth to restrictive feature: 10 to 16 inches to strongly contrasting textural stratification
Drainage class: Very poorly drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: Frequent (See Water Features table.)
Seasonal high water table, minimum depth: At the soil surface (See Water Features table.)
Available water capacity, entire profile: Moderate (about 7.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6w
Plant community classification: Farr Willow/saw-leaved (firethread) sedge (SW1215)

Typical profile
Oa—0 to 8 inches; mucky peat
A—8 to 10 inches; silt loam
Bw—10 to 15 inches; fine sandy loam
2Cg1—15 to 21 inches; very gravelly sandy loam
2Cg2—21 to 34 inches; gravelly sandy loam
3Cg3—34 to 60 inches; very gravelly loamy sand

Cryohemists and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes

Geomorphic position, three-dimensional: Mountainbases
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Organic soil material over alluvium and glacial till
Slope: 0 to 5 percent
Depth to restrictive feature: 16 to 40 inches to strongly contrasting textural stratification
Drainage class: Very poorly drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: Occasional (See Water Features table.)
Frequency of ponding: Frequent (See Water Features table.)
Seasonal high water table, minimum depth: At the soil surface (See Water Features table.)
Available water capacity, entire profile: High (about 11.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6w
Plant community classification: Farr Willow/saw-leaved (firethread) sedge (SW1215)

Typical profile
Oe—0 to 14 inches; mucky peat
Oa—14 to 19 inches; muck
2Cg1—19 to 26 inches; fine sandy loam
2Cg2—26 to 33 inches; gravelly sandy loam
3Cg3—33 to 60 inches; very gravelly loamy sand

Use and Management

Major uses: Timber production (Myerscreek soil), recreation, watershed, and wildlife habitat

249—Myerscreek-Manley complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 4,500 to 5,700 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Myerscreek, moist, and similar soils: 60 percent
Manley and similar soils: 25 percent
Named dissimilar minor components: 4 percent
Unnamed dissimilar minor components: 11 percent

Myerscreek, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Northeast
Aspect, range: West to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 35 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/twinflower (CEF222 and CEF211)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; ashy fine sandy loam
2Bw—4 to 12 inches; ashy fine sandy loam
3CB—12 to 31 inches; very gravelly sandy loam
3Cd1—31 to 46 inches; very gravelly sandy loam
3Cd2—46 to 60 inches; very gravelly sandy loam

Manley and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases
Aspect, representative: Northeast
Aspect, range: West to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 25 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/twinflower (CEF211 and CEF222)

Typical profile
C—0 to 2 inches; ashy fine sandy loam
2Bw1—2 to 13 inches; ashy fine sandy loam
2Bw2—13 to 21 inches; ashy fine sandy loam
3C—21 to 34 inches; very cobbly sandy loam
3Cd—34 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Nevine soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes

Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

250—Myerscreek-Twentymile complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,800 to 6,200 feet
Mean annual precipitation: 35 to 40 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 90 days

Map Unit Composition

Myerscreek, moist, and similar soils: 55 percent
Twentymile and similar soils: 30 percent
Named dissimilar minor components: 8 percent
Unnamed dissimilar minor components: 7 percent

Myerscreek, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Northeast
Aspect, range: Northwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 35 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/twinflower (CEF222)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; ashy fine sandy loam
2Bw—4 to 12 inches; ashy fine sandy loam
3CB—12 to 31 inches; very gravelly sandy loam
3Cd1—31 to 46 inches; very gravelly sandy loam
3Cd2—46 to 60 inches; very gravelly sandy loam

Twentymile and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: Northeast
Aspect, range: Northwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 35 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/Cascade azalea (CES214)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; ashy fine sandy loam
2Bw—4 to 13 inches; gravelly ashy fine sandy loam
3CB—13 to 31 inches; very gravelly sandy loam
3Cd1—31 to 44 inches; very gravelly sandy loam
3Cd2—44 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Manley soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases

Sitdown soils
Composition: 3 percent
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, risers, and treads

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

251—Nahahum ashy loam, 0 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,700 to 4,300 feet
Mean annual precipitation: 20 to 24 inches

Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 85 to 110 days

Map Unit Composition

Nahahum, depressional, and similar soils: 85 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Nahahum, Depressional, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial till from metasedimentary rock
Slope: 0 to 15 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: High (about 10.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/dwarf huckleberry (CDS831)

Typical profile
A—0 to 3 inches; ashy loam
Bw—3 to 12 inches; ashy loam
2Bt1—12 to 20 inches; gravelly clay loam
2Bt2—20 to 34 inches; gravelly clay loam
2Bt3—34 to 44 inches; gravelly clay loam
2BC—44 to 60 inches; gravelly loam

Named Dissimilar Minor Components

Louploup soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

252—Nahahum ashy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,100 to 4,300 feet

Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Nahahum, moist, and similar soils: 85 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Nahahum, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: East
Aspect, range: North to southeast (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial till from metasedimentary rock
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: High (about 10.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/pachistima/pinegrass (CDS412)

Typical profile
A—0 to 3 inches; ashy loam
Bw—3 to 12 inches; ashy loam
2Bt1—12 to 20 inches; gravelly clay loam
2Bt2—20 to 34 inches; gravelly clay loam
2Bt3—34 to 44 inches; gravelly clay loam
2BC—44 to 60 inches; gravelly loam

Named Dissimilar Minor Components

Nicmar soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

253—Nahahum ashy loam, cool, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope

Elevation: 3,100 to 4,300 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 95 to 120 days

Map Unit Composition

Nahahum, cool, and similar soils: 85 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Nahahum, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial till from metasedimentary rock
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: High (about 10.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/mountain snowberry (CDS629)

Typical profile
A—0 to 3 inches; ashy loam
Bw—3 to 12 inches; ashy loam
2Bt1—12 to 20 inches; gravelly clay loam
2Bt2—20 to 34 inches; gravelly clay loam
2Bt3—34 to 44 inches; gravelly clay loam
2BC—44 to 60 inches; gravelly loam

Named Dissimilar Minor Components

Midpeak soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Nicmar soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

254—Nahahum-Coxit complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,200 to 4,800 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Nahahum and similar soils: 50 percent
Coxit and similar soils: 35 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Nahahum and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial till from metasedimentary rock
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: High (about 10.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 3 inches; ashy loam
Bw—3 to 12 inches; ashy loam
2Bt1—12 to 20 inches; gravelly clay loam
2Bt2—20 to 34 inches; gravelly clay loam
2Bt3—34 to 44 inches; gravelly clay loam
2BC—44 to 60 inches; gravelly loam

Coxit and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes

Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (14 to 35 inches) over colluvium and residuum from metasedimentary rock
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A1—0 to 1 inch; gravelly ashy sandy loam
A2—1 to 7 inches; gravelly ashy sandy loam
Bw1—7 to 23 inches; very cobbly ashy sandy loam
Bw2—23 to 34 inches; very cobbly ashy sandy loam
2C1—34 to 48 inches; very cobbly sandy loam
2C2—48 to 60 inches; extremely cobbly sandy loam

Named Dissimilar Minor Components

Merkel soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

255—Nahahum-Coxit complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,400 to 4,800 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Nahahum and similar soils: 50 percent
Coxit and similar soils: 35 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Nahahum and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial till from metasedimentary rock
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: High (about 10.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 3 inches; ashy loam
Bw—3 to 12 inches; ashy loam
2Bt1—12 to 20 inches; gravelly clay loam
2Bt2—20 to 34 inches; gravelly clay loam
2Bt3—34 to 44 inches; gravelly clay loam
2BC—44 to 60 inches; gravelly loam

Coxit and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (14 to 35 inches) over colluvium and residuum from metasedimentary rock
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A1—0 to 1 inch; gravelly ashy sandy loam
A2—1 to 7 inches; gravelly ashy sandy loam

Bw1—7 to 23 inches; very cobbly ashy sandy loam
Bw2—23 to 34 inches; very cobbly ashy sandy loam
2C1—34 to 48 inches; very cobbly sandy loam
2C2—48 to 60 inches; extremely cobbly sandy loam

Named Dissimilar Minor Components

Merkel soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

256—Nanamkin gravelly sandy loam, 0 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,500 to 3,500 feet
Mean annual precipitation: 20 to 25 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Nanamkin and similar soils: 100 percent

Nanamkin and Similar Soils

Setting
Landform: Outwash terraces
Geomorphic position, three-dimensional: Treads and risers
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Glacial outwash
Slope: 0 to 15 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 6s
Plant community classification: Douglas-fir/ninebark/twinflower (CDS716)

Typical profile
A—0 to 5 inches; gravelly sandy loam
Bw1—5 to 12 inches; very gravelly loamy sand
Bw2—12 to 21 inches; very gravelly loamy coarse sand

C1—21 to 29 inches; very gravelly loamy coarse sand
2C2—29 to 37 inches; extremely gravelly loamy sand
3C3—37 to 39 inches; extremely paragravelly sand
4Bwb—39 to 46 inches; gravelly loamy coarse sand
5C—46 to 60 inches; extremely stony sand

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

257—Nevine ashy silt loams association, 5 to 20 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,000 to 5,500 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Nevine and similar soils: 55 percent
Nevine, warm, and similar soils: 45 percent

Nevine and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes and footslopes
Geomorphic position, three-dimensional: Mountainbases
Down-slope shape: Concave
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 28 inches) over glacial till
Slope: 5 to 20 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 3e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 3 inches; ashy silt loam
Bw1—3 to 8 inches; ashy fine sandy loam
Bw2—8 to 20 inches; gravelly ashy fine sandy loam
2CB—20 to 37 inches; very gravelly sandy loam
2Cd1—37 to 50 inches; very gravelly sandy loam
2Cd2—50 to 60 inches; very gravelly sandy loam

Nevine, Warm, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, footslopes, and toeslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks
Down-slope shape: Concave
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 28 inches) over glacial till
Slope: 5 to 20 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 3e
Plant community classification: Douglas-fir/ninebark (CDS715)

Typical profile
A—0 to 3 inches; ashy silt loam
Bw1—3 to 8 inches; ashy fine sandy loam
Bw2—8 to 20 inches; gravelly ashy fine sandy loam
2CB—20 to 37 inches; very gravelly sandy loam
2Cd1—37 to 50 inches; very gravelly sandy loam
2Cd2—50 to 60 inches; very gravelly sandy loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

258—Nevine ashy silt loams association, 20 to 40 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,000 to 5,500 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Nevine and similar soils: 55 percent
Nevine, warm, and similar soils: 45 percent

Nevine and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes

Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks
Down-slope shape: Concave
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 28 inches) over glacial till
Slope: 20 to 40 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 3 inches; ashy silt loam
Bw1—3 to 8 inches; ashy fine sandy loam
Bw2—8 to 20 inches; gravelly ashy fine sandy loam
2CB—20 to 37 inches; very gravelly sandy loam
2Cd1—37 to 50 inches; very gravelly sandy loam
2Cd2—50 to 60 inches; very gravelly sandy loam

Nevine, Warm, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Center third of mountainflanks, lower third of mountainflanks, and mountainbases
Down-slope shape: Concave
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 28 inches) over glacial till
Slope: 20 to 40 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/ninebark (CDS715)

Typical profile
A—0 to 3 inches; ashy silt loam
Bw1—3 to 8 inches; ashy fine sandy loam

Bw2—8 to 20 inches; gravelly ashy fine sandy loam
2CB—20 to 37 inches; very gravelly sandy loam
2Cd1—37 to 50 inches; very gravelly sandy loam
2Cd2—50 to 60 inches; very gravelly sandy loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

259—Nevine ashy silt loams association, 40 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,000 to 5,500 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Nevine and similar soils: 55 percent
Nevine, warm, and similar soils: 45 percent

Nevine and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Lower and center thirds of mountainflanks
Down-slope shape: Concave
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 28 inches) over glacial till
Slope: 40 to 65 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 3 inches; ashy silt loam
Bw1—3 to 8 inches; ashy fine sandy loam
Bw2—8 to 20 inches; gravelly ashy fine sandy loam
2CB—20 to 37 inches; very gravelly sandy loam
2Cd1—37 to 50 inches; very gravelly sandy loam
2Cd2—50 to 60 inches; very gravelly sandy loam

Nevine, Warm, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Lower third of mountainflanks; mountainbases
Down-slope shape: Concave
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 28 inches) over glacial till
Slope: 40 to 65 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/ninebark (CDS715)

Typical profile
A—0 to 3 inches; ashy silt loam
Bw1—3 to 8 inches; ashy fine sandy loam
Bw2—8 to 20 inches; gravelly ashy fine sandy loam
2CB—20 to 37 inches; very gravelly sandy loam
2Cd1—37 to 50 inches; very gravelly sandy loam
2Cd2—50 to 60 inches; very gravelly sandy loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

260—Nevine-Louploup complex, 3 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 3,200 to 4,500 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Nevine, cool, and similar soils: 55 percent
Louploup, cool, and similar soils: 30 percent
Named dissimilar minor components: 8 percent
Unnamed dissimilar minor components: 7 percent

Nevine, Cool, and Similar Soils

Setting
Landform: Mountains

Geomorphic position, two-dimensional: Toeslopes and footslopes
Geomorphic position, three-dimensional: Mountainbases
Down-slope shape: Concave
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (14 to 28 inches) over glacial till
Slope: 3 to 15 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 3e
Plant community classification: Douglas-fir/dwarf huckleberry (CDS831 and CDS813)

Typical profile
A—0 to 3 inches; ashy fine sandy loam
Bw1—3 to 8 inches; ashy fine sandy loam
Bw2—8 to 20 inches; gravelly ashy fine sandy loam
2CB—20 to 37 inches; very gravelly sandy loam
2Cd1—37 to 50 inches; very gravelly sandy loam
2Cd2—50 to 60 inches; very gravelly sandy loam

Louploup, Cool, and Similar Soils

Setting
Landform: Glacial till plains
Geomorphic position, three-dimensional: Treads
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (14 to 30 inches) over glacial till
Slope: 3 to 15 percent
Depth to restrictive feature: 40 to 50 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 3e
Plant community classification: Douglas-fir/dwarf huckleberry (CDS813 and CDS831)

Typical profile
A—0 to 6 inches; ashy fine sandy loam
Bw—6 to 21 inches; ashy fine sandy loam
2CB—21 to 41 inches; gravelly sandy loam
2Cd—41 to 60 inches; gravelly sandy loam

Named Dissimilar Minor Components

Newhorn soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Stepstone soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

261—Nevine-Louploup complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 3,000 to 5,100 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Nevine and similar soils: 50 percent
Louploup, dry, and similar soils: 30 percent
Named dissimilar minor components: 15 percent
Unnamed dissimilar minor components: 5 percent

Nevine and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks
Down-slope shape: Concave
Aspect, representative: Northeast
Aspect, range: West to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 28 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 3 inches; ashy fine sandy loam
Bw1—3 to 8 inches; ashy fine sandy loam
Bw2—8 to 20 inches; gravelly ashy fine sandy loam
2CB—20 to 37 inches; very gravelly sandy loam
2Cd1—37 to 50 inches; very gravelly sandy loam
2Cd2—50 to 60 inches; very gravelly sandy loam

Louploup, Dry, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases
Aspect, representative: Northeast
Aspect, range: West to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 30 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 40 to 50 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 6 inches; ashy fine sandy loam
Bw—6 to 21 inches; ashy fine sandy loam
2CB—21 to 41 inches; gravelly sandy loam
2Cd—41 to 60 inches; gravelly sandy loam

Named Dissimilar Minor Components

Newhorn soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Wilma soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Stepstone soils
Composition: 3 percent
Landform: Mountains

Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

262—Nevine-Louploup complex, moist, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 4,100 to 5,100 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 39 to 42 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Nevine, moist, and similar soils: 50 percent
Louploup, moist, and similar soils: 30 percent
Named dissimilar minor components: 15 percent
Unnamed dissimilar minor components: 5 percent

Nevine, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks
Down-slope shape: Concave
Aspect, representative: North
Aspect, range: Southwest to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 28 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/low huckleberry (CDS832) and Douglas-fir/blue (big) huckleberry (CDS814)

Typical profile
A—0 to 3 inches; ashy fine sandy loam
Bw1—3 to 8 inches; ashy fine sandy loam

Bw2—8 to 20 inches; gravelly ashy fine sandy loam
2CB—20 to 37 inches; very gravelly sandy loam
2Cd1—37 to 50 inches; very gravelly sandy loam
2Cd2—50 to 60 inches; very gravelly sandy loam

Louploup, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases
Aspect, representative: North
Aspect, range: Southwest to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 30 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 40 to 50 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/blue (big) huckleberry (CDS814) and Douglas-fir/low huckleberry (CDS832)

Typical profile
A—0 to 6 inches; ashy fine sandy loam
Bw—6 to 21 inches; ashy fine sandy loam
2CB—21 to 41 inches; gravelly sandy loam
2Cd—41 to 60 inches; gravelly sandy loam

Named Dissimilar Minor Components

Wilma soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Newhorn soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Stepstone soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes, toeslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Manley soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

263—Nevine-Merkel complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 3,000 to 4,900 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Nevine and similar soils: 60 percent
Merkel and similar soils: 25 percent
Named dissimilar minor components: 13 percent
Unnamed dissimilar minor components: 2 percent

Nevine and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks
Down-slope shape: Concave
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 28 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 3 inches; ashy fine sandy loam
Bw1—3 to 8 inches; ashy fine sandy loam
Bw2—8 to 20 inches; gravelly ashy fine sandy loam
2CB—20 to 37 inches; very gravelly sandy loam
2Cd1—37 to 50 inches; very gravelly sandy loam
2Cd2—50 to 60 inches; very gravelly sandy loam

Merkel and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 30 inches) over glacial till from granite
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 4 inches; ashy sandy loam
Bw1—4 to 8 inches; cobbly ashy sandy loam
Bw2—8 to 13 inches; very cobbly ashy sandy loam
2CB—13 to 21 inches; extremely cobbly sandy loam
2Cd1—21 to 38 inches; extremely gravelly sandy loam
2Cd2—38 to 60 inches; extremely cobbly loamy sand

Named Dissimilar Minor Components

Louploup soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Stepstone soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Wilma soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

264—Nevine-Merkel complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 3,600 to 4,900 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Nevine and similar soils: 50 percent
Merkel and similar soils: 35 percent
Named dissimilar minor components: 13 percent
Unnamed dissimilar minor components: 2 percent

Nevine and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks
Down-slope shape: Concave
Aspect, representative: North
Aspect, range: Southwest to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 28 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 3 inches; ashy fine sandy loam
Bw1—3 to 8 inches; ashy fine sandy loam
Bw2—8 to 20 inches; gravelly ashy fine sandy loam
2CB—20 to 37 inches; very gravelly sandy loam
2Cd1—37 to 50 inches; very gravelly sandy loam
2Cd2—50 to 60 inches; very gravelly sandy loam

Merkel and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks
Aspect, representative: North
Aspect, range: Southwest to southeast (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 30 inches) over glacial till from granite
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately low
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 6 inches; ashy sandy loam
Bw1—6 to 12 inches; gravelly ashy sandy loam
Bw2—12 to 29 inches; gravelly ashy sandy loam
2CB—29 to 35 inches; very gravelly sandy loam
2Cd—35 to 60 inches; very gravelly coarse sandy loam

Named Dissimilar Minor Components

Wilma soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Louploup soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Stepstone soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

265—Nevine-Oxerine complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,000 to 4,600 feet
Mean annual precipitation: 20 to 24 inches

Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Nevine and similar soils: 60 percent
Oxerine, dry, and similar soils: 25 percent
Named dissimilar minor components: 12 percent
Unnamed dissimilar minor components: 3 percent

Nevine and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Lower and center thirds of mountainflanks
Down-slope shape: Concave
Aspect, representative: Northeast
Aspect, range: West to south (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 28 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 3 inches; ashy fine sandy loam
Bw1—3 to 8 inches; ashy fine sandy loam
Bw2—8 to 20 inches; gravelly ashy fine sandy loam
2CB—20 to 37 inches; very gravelly sandy loam
2Cd1—37 to 50 inches; very gravelly sandy loam
2Cd2—50 to 60 inches; very gravelly sandy loam

Oxerine, Dry, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: Northeast
Aspect, range: West to south (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metasedimentary and andesitic rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high

Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 4 inches; ashy fine sandy loam
Bw—4 to 10 inches; gravelly ashy fine sandy loam
2C1—10 to 19 inches; very gravelly sandy loam
2C2—19 to 31 inches; extremely cobbly sandy loam
2R—31 to 35 inches; unweathered bedrock

Named Dissimilar Minor Components

Coxit soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Newhorn soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

266—Nevine-Wilma complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 2,800 to 4,500 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Nevine and similar soils: 50 percent
Wilma and similar soils: 30 percent
Named dissimilar minor components: 12 percent
Unnamed dissimilar minor components: 8 percent

Nevine and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes

Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks
Down-slope shape: Concave
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 28 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 3 inches; ashy fine sandy loam
Bw1—3 to 8 inches; ashy fine sandy loam
Bw2—8 to 20 inches; gravelly ashy fine sandy loam
2CB—20 to 37 inches; very gravelly sandy loam
2Cd1—37 to 50 inches; very gravelly sandy loam
2Cd2—50 to 60 inches; very gravelly sandy loam

Wilma and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 14 inches) over colluvium and residuum from metavolcanics and granite
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131) and Douglas-fir/pinegrass–bluebunch wheatgrass (CDG134)

Typical profile
A—0 to 6 inches; gravelly ashy fine sandy loam
Bw—6 to 12 inches; gravelly ashy fine sandy loam
2BC—12 to 17 inches; very cobbly fine sandy loam

2C—17 to 28 inches; extremely gravelly coarse sandy loam
2R—28 to 32 inches; unweathered bedrock

Named Dissimilar Minor Components

Louploup soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Stepstone soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

267—Nevine-Wilma complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 2,800 to 4,500 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Nevine and similar soils: 50 percent
Wilma, dry, and similar soils: 30 percent
Named dissimilar minor components: 12 percent
Unnamed dissimilar minor components: 8 percent

Nevine and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks
Down-slope shape: Concave
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 28 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained

Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 3 inches; ashy fine sandy loam
Bw1—3 to 8 inches; ashy fine sandy loam
Bw2—8 to 20 inches; gravelly ashy fine sandy loam
2CB—20 to 37 inches; very gravelly sandy loam
2Cd1—37 to 50 inches; very gravelly sandy loam
2Cd2—50 to 60 inches; very gravelly sandy loam

Wilma, Dry, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 14 inches) over colluvium and residuum from metavolcanics and granite
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass–bluebunch wheatgrass (CDG134) and Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 6 inches; gravelly ashy fine sandy loam
Bw—6 to 12 inches; gravelly ashy fine sandy loam
2BC—12 to 17 inches; very cobbly fine sandy loam
2C—17 to 28 inches; extremely gravelly coarse sandy loam
2R—28 to 32 inches; unweathered bedrock

Named Dissimilar Minor Components

Louploup soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Stepstone soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

268—Nevine-Wilma-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 4,500 to 5,100 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Nevine and similar soils: 50 percent
Wilma and similar soils: 25 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 11 percent
Unnamed dissimilar minor components: 4 percent

Nevine and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks
Down-slope shape: Concave
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 28 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 3 inches; ashy fine sandy loam
Bw1—3 to 8 inches; ashy fine sandy loam
Bw2—8 to 20 inches; gravelly ashy fine sandy loam
2CB—20 to 37 inches; very gravelly sandy loam
2Cd1—37 to 50 inches; very gravelly sandy loam
2Cd2—50 to 60 inches; very gravelly sandy loam

Wilma and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 14 inches) over colluvium and residuum from metavolcanics and granite
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 6 inches; gravelly ashy fine sandy loam
Bw—6 to 12 inches; gravelly ashy fine sandy loam
2BC—12 to 17 inches; very cobbly fine sandy loam
2C—17 to 28 inches; extremely gravelly coarse sandy loam
2R—28 to 32 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Lithic Haploxerepts
Composition: 4 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Stepstone soils
Composition: 4 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Newhorn soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

269—Newbon gravelly loam, 8 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 8—Columbia Plateau
Elevation: 1,800 to 3,000 feet
Mean annual precipitation: 11 to 15 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 130 to 150 days

Map Unit Composition

Newbon and similar soils: 100 percent

Newbon and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Glacial till
Slope: 8 to 25 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Land capability classification, irrigated: 6e
Ecological site: Loamy 9-15 P.Z. (R008XY102WA)

Typical profile
A1—0 to 2 inches; gravelly loam
A2—2 to 13 inches; gravelly loam
Bw—13 to 25 inches; gravelly loam
C—25 to 60 inches; very gravelly loam

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

270—Newbon gravelly loam, 25 to 45 percent slopes

Map Unit Setting

Major land resource area (MLRA): 8—Columbia Plateau
Elevation: 1,800 to 3,000 feet
Mean annual precipitation: 11 to 15 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 130 to 150 days

Map Unit Composition

Newbon and similar soils: 100 percent

Newbon and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities
Parent material: Glacial till
Slope: 25 to 45 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Ecological site: Loamy 9-15 P.Z. (R008XY102WA)

Typical profile
A1—0 to 2 inches; gravelly loam
A2—2 to 13 inches; gravelly loam
Bw—13 to 25 inches; gravelly loam
C—25 to 60 inches; very gravelly loam

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

271—Newbon gravelly loam, 25 to 45 percent north slopes

Map Unit Setting

Major land resource area (MLRA): 8—Columbia Plateau
Elevation: 1,800 to 3,000 feet
Mean annual precipitation: 11 to 15 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 130 to 150 days

Map Unit Composition

Newbon and similar soils: 100 percent

Newbon and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: West
Aspect, range: West to northwest (clockwise)

Properties and qualities
Parent material: Glacial till
Slope: 25 to 45 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Ecological site: Cool Loamy 9-15 P.Z. (R008XY103WA)

Typical profile
A1—0 to 2 inches; gravelly loam
A2—2 to 13 inches; gravelly loam
Bw—13 to 25 inches; gravelly loam
C—25 to 60 inches; very gravelly loam

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

272—Newbon stony loam, 0 to 45 percent slopes

Map Unit Setting

Major land resource area (MLRA): 8—Columbia Plateau
Elevation: 1,800 to 3,000 feet
Mean annual precipitation: 11 to 15 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 130 to 150 days

Map Unit Composition

Newbon and similar soils: 100 percent

Newbon and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Glacial till
Slope: 0 to 45 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Ecological site: Dry Stony 9-12 P.Z., aridic (R008XY201WA)

Typical profile
A1—0 to 2 inches; stony loam
A2—2 to 13 inches; stony loam
Bw—13 to 25 inches; gravelly loam
C—25 to 60 inches; very gravelly loam

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

273—Newbon very gravelly loam, 25 to 65 percent slopes, eroded

Map Unit Setting

Major land resource area (MLRA): 8—Columbia Plateau
Elevation: 1,800 to 3,000 feet
Mean annual precipitation: 11 to 15 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 130 to 150 days

Map Unit Composition

Newbon and similar soils: 100 percent

Newbon and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: Southeast to southwest (clockwise)

Properties and qualities
Parent material: Glacial till
Slope: 25 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Loamy 9-15 P.Z. (R008XY102WA)

Typical profile
A1—0 to 2 inches; very gravelly loam
A2—2 to 13 inches; gravelly loam
Bw—13 to 25 inches; gravelly loam
C—25 to 60 inches; very gravelly loam

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

274—Newhorn ashy fine sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,500 to 4,600 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Newhorn and similar soils: 85 percent
Named dissimilar minor components: 13 percent
Unnamed dissimilar minor components: 2 percent

Newhorn and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 6.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 4 inches; ashy fine sandy loam
Bw—4 to 13 inches; ashy fine sandy loam
2CB—13 to 28 inches; very gravelly sandy loam

2C—28 to 36 inches; very gravelly sandy loam
2Cd—36 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Merkel soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Nevine soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Goddard soils
Composition: 3 percent
Landform: Outwash terraces
Geomorphic position, three-dimensional: Risers and treads

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

275—Newhorn ashy fine sandy loam, moist, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,300 to 4,800 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Newhorn and similar soils: 85 percent
Named dissimilar minor components: 13 percent
Unnamed dissimilar minor components: 2 percent

Newhorn and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: West
Aspect, range: Southeast to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained

Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 6.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/low huckleberry/pinegrass (CDS833)

Typical profile
A—0 to 4 inches; ashy fine sandy loam
Bw—4 to 13 inches; ashy fine sandy loam
2CB—13 to 28 inches; very gravelly sandy loam
2C—28 to 36 inches; very gravelly sandy loam
2Cd—36 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Merkel soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Pebcreek soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Nevine soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

276—Nicmar ashy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,800 to 4,300 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 42 to 45 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Nicmar and similar soils: 75 percent
Named dissimilar minor components: 20 percent
Unnamed dissimilar minor components: 5 percent

Nicmar and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks
Aspect, representative: Northeast
Aspect, range: West to southeast (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 25 inches) over glacial till from volcanic and sedimentary rock
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 8.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/ninebark (CDS715)

Typical profile
A—0 to 4 inches; ashy loam
Bw—4 to 16 inches; gravelly ashy loam
2Bt1—16 to 23 inches; very cobbly clay loam
2Bt2—23 to 33 inches; very cobbly clay loam
2BC—33 to 60 inches; very gravelly sandy clay loam

Named Dissimilar Minor Components

Baldknob soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Oxerine soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops

Scoap soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Thout soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

277—Nicmar gravelly ashy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,900 to 4,420 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Nicmar and similar soils: 85 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Nicmar and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 25 inches) over glacial till from volcanic and sedimentary rock
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 8.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 4 inches; gravelly ashy loam
Bw—4 to 16 inches; gravelly ashy loam
2Bt1—16 to 23 inches; very cobbly clay loam
2Bt2—23 to 33 inches; very cobbly clay loam
2BC—33 to 60 inches; very gravelly sandy clay loam

Named Dissimilar Minor Components

Rendovy soils
Composition: 5 percent
Landform: Mountains

Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Santop soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

278—Nicmar-Baldknob-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,800 to 4,000 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 42 to 50 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Nicmar, warm, and similar soils: 50 percent
Baldknob and similar soils: 25 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 8 percent
Unnamed dissimilar minor components: 7 percent

Nicmar, Warm, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 25 inches) over glacial till from volcanic and sedimentary rock
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 8.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/mountain snowberry (CDS629 and CDS632)

Typical profile
A—0 to 4 inches; ashy loam
Bw—4 to 16 inches; gravelly ashy loam
2Bt1—16 to 23 inches; very cobbly clay loam
2Bt2—23 to 33 inches; very cobbly clay loam
2BC—33 to 60 inches; very gravelly sandy clay loam

Baldknob and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Colluvium and residuum derived from volcanic rocks
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Dry Stony 15+ P.Z. (R006XY201WA)

Typical profile
A—0 to 3 inches; gravelly ashy loam
Bw—3 to 12 inches; very flaggy loam
R—12 to 16 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Borgeau soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Thout soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, timber production (Nicmar soil), recreation, watershed, and wildlife habitat

279—Nicmar-Santop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,500 to 5,100 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Nicmar and similar soils: 60 percent
Santop and similar soils: 25 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Nicmar and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 25 inches) over glacial till from volcanic and sedimentary rock
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 8.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 4 inches; gravelly ashy loam
Bw—4 to 16 inches; gravelly ashy loam
2Bt1—16 to 23 inches; very cobbly clay loam
2Bt2—23 to 33 inches; very cobbly clay loam
2BC—33 to 60 inches; very gravelly sandy clay loam

Santop and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 18 inches) over colluvium and residuum from volcanic and sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 5 inches; gravelly ashy sandy loam
Bw—5 to 15 inches; very gravelly ashy sandy loam
2C—15 to 34 inches; extremely stony sandy loam
2R—34 to 38 inches; unweathered bedrock

Named Dissimilar Minor Components

Rendovy soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

280—Ortellcreek gravelly ashy sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,200 to 5,400 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Ortellcreek and similar soils: 80 percent
Named dissimilar minor components: 12 percent
Unnamed dissimilar minor components: 8 percent

Ortellcreek and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till from volcanic and sedimentary rock
Slope: 15 to 35 percent
Depth to restrictive feature: 35 to 45 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES342)

Typical profile
A—0 to 5 inches; gravelly ashy sandy loam
Bw—5 to 13 inches; gravelly ashy sandy loam
2E/Bt—13 to 19 inches; gravelly sandy loam
2Bt—19 to 35 inches; very gravelly sandy clay loam
3Btd—35 to 60 inches; very gravelly clay loam

Named Dissimilar Minor Components

Finney soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Myerscreek soils
Composition: 5 percent
Landform: Glacial moraines on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainflanks

Rendovy soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

281—Ortellcreek gravelly ashy sandy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,500 to 5,800 feet
Mean annual precipitation: 25 to 35 inches

Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Ortellcreek and similar soils: 80 percent
Named dissimilar minor components: 11 percent
Unnamed dissimilar minor components: 9 percent

Ortellcreek and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: Northeast
Aspect, range: Northwest to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till from volcanic and sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 35 to 45 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES342)

Typical profile
A—0 to 5 inches; gravelly ashy sandy loam
Bw—5 to 13 inches; gravelly ashy sandy loam
2E/Bt—13 to 19 inches; gravelly sandy loam
2Bt—19 to 35 inches; very gravelly sandy clay loam
3Btd—35 to 60 inches; very gravelly clay loam

Named Dissimilar Minor Components

Myerscreek soils
Composition: 5 percent
Landform: Glacial moraines on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainflanks

Finney soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Rendovy soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

282—Oxerine ashy fine sandy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,400 to 4,800 feet
Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Oxerine, dry, and similar soils: 85 percent
Unnamed dissimilar minor components: 15 percent

Oxerine, Dry, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: Northeast to northwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metasedimentary and andesitic rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 4 inches; ashy fine sandy loam
Bw—4 to 10 inches; gravelly ashy fine sandy loam
2C1—10 to 19 inches; very gravelly sandy loam
2C2—19 to 31 inches; extremely cobbly sandy loam
2R—31 to 35 inches; unweathered bedrock

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

283—Oxerine-Lithic Haploxerepts-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,800 to 4,700 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 41 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Oxerine, warm, and similar soils: 55 percent
Lithic Haploxerepts, forested, and similar soils: 20 percent
Rock outcrop: 10 percent
Unnamed dissimilar minor components: 15 percent

Oxerine, Warm, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metasedimentary and andesitic rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/ninebark (CDS715)

Typical profile
A—0 to 4 inches; ashy fine sandy loam
Bw—4 to 10 inches; gravelly ashy fine sandy loam
2C1—10 to 19 inches; very gravelly sandy loam
2C2—19 to 31 inches; extremely cobbly sandy loam
2R—31 to 35 inches; unweathered bedrock

Lithic Haploxerepts, Forested, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over bedrock
Slope: 35 to 65 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Plant community classification: Douglas-fir/ninebark (CDS715)

Typical profile
A—0 to 3 inches; cobbly ashy sandy loam
Bw—3 to 12 inches; cobbly ashy sandy loam
2C—12 to 18 inches; very gravelly sandy loam
2R—18 to 22 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

284—Oxerine-Nevine complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 3,000 to 5,100 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 41 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Oxerine, warm, and similar soils: 55 percent
Nevine, warm, and similar soils: 30 percent
Named dissimilar minor components: 7 percent
Unnamed dissimilar minor components: 8 percent

Oxerine, Warm, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metasedimentary and andesitic rock

Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/ninebark (CDS715)

Typical profile
A—0 to 4 inches; ashy fine sandy loam
Bw—4 to 10 inches; gravelly ashy fine sandy loam
2C1—10 to 19 inches; very gravelly sandy loam
2C2—19 to 31 inches; extremely cobbly sandy loam
2R—31 to 35 inches; unweathered bedrock

Nevine, Warm, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Lower and center thirds of mountainflanks
Down-slope shape: Concave
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 28 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/ninebark (CDS715)

Typical profile
A—0 to 3 inches; ashy fine sandy loam
Bw1—3 to 8 inches; ashy fine sandy loam
Bw2—8 to 20 inches; gravelly ashy fine sandy loam
2CB—20 to 37 inches; very gravelly sandy loam
2Cd1—37 to 50 inches; very gravelly sandy loam
2Cd2—50 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Louploup soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes and backslopes

Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

285—Oxerine-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,400 to 4,200 feet
Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 95 to 120 days

Map Unit Composition

Oxerine, cool, and similar soils: 75 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Oxerine, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: Northeast
Aspect, range: Northwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metasedimentary and andesitic rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/mountain snowberry (CDS629)

Typical profile
A—0 to 4 inches; ashy fine sandy loam
Bw—4 to 10 inches; gravelly ashy fine sandy loam
2C1—10 to 19 inches; very gravelly sandy loam
2C2—19 to 31 inches; extremely cobbly sandy loam
2R—31 to 35 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Lithic Haploxerepts
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

286—Pebcreek stony ashy sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,000 to 5,000 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 39 to 42 degrees F
Frost-free period: 95 to 125 days

Map Unit Composition

Pebcreek and similar soils: 85 percent
Named dissimilar minor components: 4 percent
Unnamed dissimilar minor components: 11 percent

Pebcreek and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: Northwest
Aspect, range: South to east (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 14 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification; 30 to 45 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/low huckleberry (CDS832)

Typical profile
A—0 to 5 inches; stony ashy sandy loam
Bw—5 to 11 inches; gravelly ashy sandy loam
2C/B—11 to 37 inches; very gravelly sand
2C—37 to 42 inches; very gravelly loamy sand
2Cd—42 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Rock outcrop
Composition: 4 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

287—Pebcreek stony ashy sandy loam, dry, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,300 to 5,000 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Pebcreek and similar soils: 85 percent
Named dissimilar minor components: 7 percent
Unnamed dissimilar minor components: 8 percent

Pebcreek and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 14 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification; 30 to 45 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 5 inches; stony ashy sandy loam
Bw—5 to 11 inches; gravelly ashy sandy loam
2C/B—11 to 37 inches; very gravelly sand
2C—37 to 42 inches; very gravelly loamy sand
2Cd—42 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Brevco soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

288—Pebcreek-Brevco complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,400 to 5,500 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 39 to 42 degrees F
Frost-free period: 85 to 115 days

Map Unit Composition

Pebcreek and similar soils: 45 percent
Brevco, cool, and similar soils: 40 percent
Named dissimilar minor components: 3 percent
Unnamed dissimilar minor components: 12 percent

Pebcreek and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 14 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification; 30 to 45 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/low huckleberry (CDS832)

Typical profile
A—0 to 5 inches; ashy sandy loam
Bw—5 to 11 inches; gravelly ashy sandy loam
2C/B—11 to 37 inches; very gravelly sand
2C—37 to 42 inches; very gravelly loamy sand
2Cd—42 to 60 inches; very gravelly sandy loam

Brevco, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 14 inches) over colluvium and residuum from granitic rocks
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/low huckleberry (CDS832)

Typical profile
A—0 to 3 inches; gravelly ashy coarse sandy loam
Bw—3 to 11 inches; gravelly ashy coarse sandy loam
2C1—11 to 25 inches; very gravelly sandy loam
2C2—25 to 38 inches; very cobbly coarse sandy loam
2R—38 to 48 inches; unweathered bedrock

Named Dissimilar Minor Components

Rock outcrop
Composition: 3 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

289—Pebcreek-Brevco complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,000 to 5,000 feet
Mean annual precipitation: 20 to 24 inches

Mean annual air temperature: 39 to 42 degrees F
Frost-free period: 85 to 115 days

Map Unit Composition

Pebcreek and similar soils: 50 percent
Brevco, cool, and similar soils: 30 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 10 percent

Pebcreek and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: Northwest
Aspect, range: Southwest to northeast (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 14 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification; 30 to 45 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/low huckleberry (CDS832)

Typical profile
A—0 to 5 inches; ashy sandy loam
Bw—5 to 11 inches; gravelly ashy sandy loam
2C/B—11 to 37 inches; very gravelly sand
2C—37 to 42 inches; very gravelly loamy sand
2Cd—42 to 60 inches; very gravelly sandy loam

Brevco, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Northwest
Aspect, range: Southwest to northeast (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 14 inches) over colluvium and residuum from granitic rocks
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None

Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/low huckleberry (CDS832)

Typical profile
A—0 to 3 inches; stony ashy coarse sandy loam
Bw—3 to 11 inches; gravelly ashy coarse sandy loam
2C1—11 to 25 inches; very gravelly sandy loam
2C2—25 to 38 inches; very cobbly coarse sandy loam
2R—38 to 48 inches; unweathered bedrock

Named Dissimilar Minor Components

Myerscreek soils
Composition: 5 percent
Landform: Glacial moraines on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainflanks

Rock outcrop
Composition: 5 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

290—Pebcreek-Lithic Haploxerepts-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,500 to 4,000 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Pebcreek, dry, and similar soils: 45 percent
Lithic Haploxerepts, forested, dry, and similar soils: 25 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Pebcreek, Dry, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: West
Aspect, range: South to northwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 14 inches) over glacial till

Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification; 30 to 45 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 5 inches; stony ashy sandy loam
Bw—5 to 11 inches; gravelly ashy sandy loam
2C/B—11 to 37 inches; very gravelly sand
2C—37 to 42 inches; very gravelly loamy sand
2Cd—42 to 60 inches; very gravelly sandy loam

Lithic Haploxerepts, Forested, Dry, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: West
Aspect, range: South to northwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over bedrock
Slope: 35 to 65 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Plant community classification: Douglas-fir/bitterbrush/pinegrass (CDS675)

Typical profile
A—0 to 3 inches; very stony ashy sandy loam
Bw—3 to 12 inches; cobbly ashy sandy loam
2C—12 to 18 inches; very gravelly sandy loam
2R—18 to 22 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Brevco soils
Composition: 5 percent

Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Merkel soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

291—Peka ashy sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,800 to 3,500 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Peka and similar soils: 85 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Peka and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: South
Aspect, range: Southeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic rock (10 to 18 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Ponderosa pine/bluebunch wheatgrass (CPG141)

Typical profile
A1—0 to 6 inches; ashy sandy loam
A2—6 to 15 inches; gravelly ashy sandy loam

2Bw—15 to 24 inches; very cobbly sandy loam
2C—24 to 49 inches; very cobbly sandy loam
2Cd—49 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Donavan soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

292—Peka-Donavan complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 1,800 to 4,500 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 90 to 130 days

Map Unit Composition

Peka, moist, and similar soils: 60 percent
Donavan and similar soils: 25 percent
Named dissimilar minor components: 12 percent
Unnamed dissimilar minor components: 3 percent

Peka, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic rock (10 to 18 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Ponderosa pine–Douglas-fir/bluebunch wheatgrass (CDG311) and ponderosa pine/bluebunch wheatgrass (CPG141)

Typical profile
A1—0 to 6 inches; stony ashy sandy loam

A2—6 to 15 inches; gravelly ashy sandy loam
2Bw—15 to 24 inches; very cobbly sandy loam
2C—24 to 49 inches; very cobbly sandy loam
2Cd—49 to 60 inches; very gravelly sandy loam

Donavan and Similar Soils

Setting
Landform: Glaciated foothills; glaciated mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Center thirds of mountainflanks, lower thirds of mountainflanks, base slopes, side slopes, nose slopes, and head slopes
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 19 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately low
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: High (about 10.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Land capability classification, irrigated: 7e
Plant community classification: Ponderosa pine/bluebunch wheatgrass (CPG141)

Typical profile
A1—0 to 2 inches; ashy loam
A2—2 to 7 inches; ashy silt loam
Bw—7 to 20 inches; ashy loam
2Cd1—20 to 39 inches; gravelly silt loam
2Cd2—39 to 60 inches; gravelly sandy loam

Named Dissimilar Minor Components

Vanbrunt soils
Composition: 9 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Rock outcrop
Composition: 3 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

293—Peka-Swakane-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope

Elevation: 3,100 to 4,500 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Peka, moist, and similar soils: 50 percent
Swakane and similar soils: 25 percent
Rock outcrop: 15 percent
Unnamed dissimilar minor components: 10 percent

Peka, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic rock (10 to 18 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Ponderosa pine–Douglas-fir/bluebunch wheatgrass (CDG311) and ponderosa pine/bitterbrush/bluebunch wheatgrass (CPS241)

Typical profile
A1—0 to 6 inches; stony ashy sandy loam
A2—6 to 15 inches; gravelly ashy sandy loam
2Bw—15 to 24 inches; very cobbly sandy loam
2C—24 to 49 inches; very cobbly sandy loam
2Cd—49 to 60 inches; very gravelly sandy loam

Swakane and Similar Soils

Setting
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Nose slopes, side slopes, and head slopes
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 12 inches) over colluvium and residuum from granitic and metamorphic rocks
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High

Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 4 inches; very stony ashy sandy loam
A2—4 to 11 inches; very gravelly ashy sandy loam
2Bw—11 to 17 inches; very gravelly sandy loam
2R—17 to 21 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Use and Management

Major uses: Livestock grazing, timber production (Peka soil), recreation, watershed, and wildlife habitat

294—Pelican gravelly ashy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,900 to 4,800 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 39 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Pelican and similar soils: 85 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Pelican and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: East
Aspect, range: Northeast to southeast (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 25 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 35 to 50 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Mountain Park (R006XY702WA)

Typical profile
A—0 to 11 inches; gravelly ashy loam
2Bw1—11 to 18 inches; gravelly sandy loam
2Bw2—18 to 28 inches; very gravelly sandy loam
3C1—28 to 37 inches; very gravelly sandy loam
3C2—37 to 46 inches; very gravelly sandy loam
3Cd—46 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Rock outcrop
Composition: 5 percent

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

295—Pepoon-Edds complex, 15 to 50 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,500 to 5,000 feet
Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 37 to 44 degrees F
Frost-free period: 80 to 110 days

Map Unit Composition

Pepoon and similar soils: 55 percent
Edds and similar soils: 45 percent

Pepoon and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 15 inches) over bedrock
Slope: 15 to 50 percent
Depth to restrictive feature: 8 to 15 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Mountain Park (R043AY702WA)

Typical profile
A1—0 to 5 inches; stony ashy loam
A2—5 to 10 inches; extremely stony ashy loam
R—10 to 14 inches; unweathered bedrock

Edds and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (21 to 31 inches) over glacial till
Slope: 15 to 50 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: High (about 9.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/pinegrass (CEG311)

Typical profile
A—0 to 6 inches; gravelly ashy loam
AB—6 to 12 inches; ashy loam
Bw1—12 to 17 inches; ashy loam
Bw2—17 to 24 inches; ashy clay loam
2C1—24 to 28 inches; silt loam
3C2—28 to 40 inches; gravelly loamy coarse sand
4C3—40 to 60 inches; gravelly loam

Use and Management

Major uses: Livestock grazing, timber production (Edds soil), recreation, watershed, and wildlife habitat

296—Pepoon-Togo complex, 15 to 50 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,500 to 5,000 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 37 to 44 degrees F
Frost-free period: 70 to 110 days

Map Unit Composition

Pepoon and similar soils: 70 percent
Togo and similar soils: 30 percent

Pepoon and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops
Aspect, representative: Southeast
Aspect, range: Northeast to south (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 15 inches) over bedrock
Slope: 15 to 50 percent
Depth to restrictive feature: 8 to 15 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Mountain Park (R043AY702WA)

Typical profile
A1—0 to 5 inches; stony ashy loam
A2—5 to 10 inches; extremely stony ashy loam
R—10 to 14 inches; unweathered bedrock

Togo and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes, backslopes, and shoulders
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Aspect, representative: Southeast
Aspect, range: Northeast to south (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 20 inches) over colluvium, residuum, and glacial till from granite
Slope: 15 to 40 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
A1—0 to 4 inches; ashy loam
Bw1—4 to 15 inches; ashy loam
Bw2—15 to 28 inches; very gravelly ashy loam

2C1—28 to 60 inches; very gravelly sandy loam
2C2—60 to 65 inches; extremely gravelly sandy loam

Use and Management

Major uses: Livestock grazing, timber production (Togo soil), recreation, watershed, and wildlife habitat

297—Pettijohn-Mineral-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 5,200 to 5,900 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 42 to 46 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Pettijohn and similar soils: 45 percent
Mineral and similar soils: 20 percent
Rock outcrop: 20 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Pettijohn and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (30 to 45 inches) over granitic colluvium
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 9.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 4 inches; stony ashy fine sandy loam
Bw1—4 to 24 inches; very cobbly ashy fine sandy loam
Bw2—24 to 42 inches; very stony ashy fine sandy loam
2C—42 to 60 inches; very gravelly sandy loam

Mineral and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium and residuum from granite and metamorphic rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131) and Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 6 inches; stony ashy loam
Bw—6 to 12 inches; very gravelly ashy loam
2C—12 to 23 inches; very stony sandy loam
2R—23 to 27 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Nevine soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Devore soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Rubble land
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

298—Pettijohn-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 4,400 to 5,200 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 42 to 46 degrees F
Frost-free period: 95 to 120 days

Map Unit Composition

Pettijohn and similar soils: 65 percent
Rock outcrop: 25 percent
Named dissimilar minor components: 3 percent
Unnamed dissimilar minor components: 7 percent

Pettijohn and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: East
Aspect, range: North to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (30 to 45 inches) over granitic colluvium
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 9.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655) and Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 4 inches; stony ashy fine sandy loam
Bw1—4 to 24 inches; very cobbly ashy fine sandy loam
Bw2—24 to 42 inches; very stony ashy fine sandy loam
2C—42 to 60 inches; very gravelly sandy loam

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Nevine soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

299—Pettijohn-Wilma complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 2,600 to 5,000 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Pettijohn and similar soils: 50 percent
Wilma and similar soils: 35 percent
Named dissimilar minor components: 11 percent
Unnamed dissimilar minor components: 4 percent

Pettijohn and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Northwest
Aspect, range: Southwest to north (clockwise)

Properties and qualities
Parent material: Volcanic ash (30 to 45 inches) over granitic colluvium
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 9.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 4 inches; stony ashy fine sandy loam
Bw1—4 to 24 inches; very cobbly ashy fine sandy loam
Bw2—24 to 42 inches; very stony ashy fine sandy loam
2C—42 to 60 inches; very gravelly sandy loam

Wilma and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Aspect, representative: Northwest
Aspect, range: Southwest to north (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 14 inches) over colluvium and residuum from metavolcanics and granite
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 6 inches; gravelly ashy fine sandy loam
Bw—6 to 12 inches; gravelly ashy fine sandy loam
2BC—12 to 17 inches; very cobbly fine sandy loam
2C—17 to 28 inches; extremely gravelly coarse sandy loam
2R—28 to 32 inches; unweathered bedrock

Named Dissimilar Minor Components

Longort soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Brevco soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Rock outcrop
Composition: 3 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

300—Radercreek-Santop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,350 to 4,900 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Radercreek and similar soils: 60 percent
Santop and similar soils: 25 percent
Named dissimilar minor components: 15 percent

Radercreek and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 24 inches) over colluvium and residuum from volcanic and sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pachistima/pinegrass (CDS412)

Typical profile
A—0 to 5 inches; gravelly ashy sandy loam
Bw1—5 to 12 inches; gravelly ashy sandy loam
Bw2—12 to 17 inches; very gravelly ashy sandy loam
2C1—17 to 24 inches; very cobbly sandy loam
2C2—24 to 43 inches; very cobbly sandy loam
2R—43 to 47 inches; unweathered bedrock

Santop and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 18 inches) over colluvium and residuum from volcanic and sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 5 inches; gravelly ashy sandy loam
Bw—5 to 15 inches; very gravelly ashy sandy loam
2C—15 to 34 inches; extremely stony sandy loam
2R—34 to 38 inches; unweathered bedrock

Named Dissimilar Minor Components

Goshawk soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and backslopes
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Rock outcrop
Composition: 5 percent

Stemilt soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

301—Redpeak-Ontrail complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,200 to 3,800 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Redpeak and similar soils: 55 percent
Ontrail and similar soils: 30 percent
Named dissimilar minor components: 15 percent

Redpeak and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: Northeast
Aspect, range: Northwest to east (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 17 inches) over colluvium and residuum from volcanic and sedimentary rock

Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw1—4 to 9 inches; gravelly ashy sandy loam
Bw2—9 to 16 inches; very gravelly ashy sandy loam
2C1—16 to 28 inches; very gravelly sandy loam
2C2—28 to 35 inches; very gravelly sandy loam
2R—35 to 39 inches; unweathered bedrock

Ontrail and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Northeast
Aspect, range: Northwest to east (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 20 inches) over colluvium derived from volcanic and sedimentary rock
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw—4 to 16 inches; gravelly ashy sandy loam
2C1—16 to 32 inches; very gravelly sandy loam
2C2—32 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Farway soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Johntom soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Veridge soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

302—Remmel-Devore-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 5,800 to 7,000 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Remmel, cold, and similar soils: 55 percent
Devore, cold, and similar soils: 20 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 7 percent
Unnamed dissimilar minor components: 3 percent

Remmel, Cold, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium over glacial till from granite
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e

Plant community classification: Whitebark pine/grouse blueberry (huckleberry)/smooth woodrush (CAS311)

Typical profile
A—0 to 4 inches; very stony ashy sandy loam
Bw1—4 to 8 inches; gravelly ashy sandy loam
Bw2—8 to 13 inches; very gravelly ashy sandy loam
2BC—13 to 29 inches; very cobbly coarse sandy loam
2C1—29 to 41 inches; extremely cobbly sandy loam
3C2—41 to 60 inches; extremely cobbly loamy coarse sand

Devore, Cold, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metamorphic rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Whitebark pine/grouse blueberry (huckleberry)/smooth woodrush (CAS311)

Typical profile
C—0 to 1 inch; stony ashy sandy loam
2A—1 to 4 inches; very stony ashy fine sandy loam
2Bw—4 to 11 inches; very stony ashy fine sandy loam
3C1—11 to 23 inches; extremely stony coarse sandy loam
3C2—23 to 32 inches; extremely stony coarse sandy loam
3R—32 to 36 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Treebutte soils
Composition: 4 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops

Chutes
Composition: 3 percent
Landform: Mountains

Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

303—Remmel-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 5,400 to 6,500 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Remmel and similar soils: 70 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Remmel and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium over glacial till from granite
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
A—0 to 4 inches; very stony ashy sandy loam
Bw1—4 to 8 inches; gravelly ashy sandy loam
Bw2—8 to 13 inches; very gravelly ashy sandy loam
2BC—13 to 29 inches; very cobbly coarse sandy loam
2C1—29 to 41 inches; extremely cobbly sandy loam
3C2—41 to 60 inches; extremely cobbly loamy coarse sand

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Chutes
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Devore soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

304—Rendovy gravelly ashy fine sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,600 to 5,200 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Rendovy and similar soils: 85 percent
Named dissimilar minor components: 15 percent

Rendovy and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: Northeast
Aspect, range: West to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till from volcanic and sedimentary rock
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 5 inches; gravelly ashy fine sandy loam
Bw—5 to 12 inches; gravelly ashy sandy loam
2Bt1—12 to 24 inches; very gravelly sandy loam
3Bt2—24 to 35 inches; very gravelly sandy clay loam
3Bt3—35 to 46 inches; very gravelly sandy clay loam
3Bt4—46 to 60 inches; very gravelly sandy clay loam

Named Dissimilar Minor Components

Nevine soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Oxerine soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops

Salcreek soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

305—Rendovy-Goshawk complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,500 to 5,200 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Rendovy and similar soils: 55 percent
Goshawk and similar soils: 25 percent
Named dissimilar minor components: 15 percent
Unnamed dissimilar minor components: 5 percent

Rendovy and Similar Soils

Setting
Landform: Mountains

Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till from volcanic and sedimentary rock
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 5 inches; gravelly ashy fine sandy loam
Bw—5 to 12 inches; gravelly ashy sandy loam
2Bt1—12 to 24 inches; very gravelly sandy loam
3Bt2—24 to 35 inches; very gravelly sandy clay loam
3Bt3—35 to 46 inches; very gravelly sandy clay loam
3Bt4—46 to 60 inches; very gravelly sandy clay loam

Goshawk and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and backslopes
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from volcanic and sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 9 inches; gravelly ashy sandy loam
Bw—9 to 14 inches; gravelly ashy sandy loam
2Bt1—14 to 22 inches; extremely gravelly loam
2Bt2—22 to 27 inches; extremely gravelly loam
2R—27 to 31 inches; unweathered bedrock

Named Dissimilar Minor Components

Nicmar soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Santop soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Rendovy soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Ortellcreek soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

306—Republic ashy loam, 0 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 2,500 to 4,700 feet
Mean annual precipitation: 17 to 20 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 130 days

Map Unit Composition

Republic and similar soils: 85 percent
Named dissimilar minor components: 8 percent
Unnamed dissimilar minor components: 7 percent

Republic and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks
Aspect, representative: Southwest
Aspect, range: East to northwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 15 inches) over alluvium and glacial till

Slope: 0 to 15 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 3e
Plant community classification: Douglas-fir/pinegrass–bluebunch wheatgrass (CDG134) and Douglas-fir/pinegrass (CDG131)

Typical profile
A1—0 to 6 inches; ashy loam
A2—6 to 15 inches; ashy sandy loam
2Bw1—15 to 28 inches; sandy loam
2Bw2—28 to 35 inches; gravelly sandy loam
2C—35 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Merkel soils
Composition: 8 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

307—Republic ashy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 2,800 to 4,100 feet
Mean annual precipitation: 17 to 20 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 130 days

Map Unit Composition

Republic and similar soils: 85 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Republic and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 15 inches) over alluvium and glacial till
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131) and Douglas-fir/pinegrass–bluebunch wheatgrass (CDG134)

Typical profile
A1—0 to 6 inches; ashy loam
A2—6 to 15 inches; ashy sandy loam
2Bw1—15 to 28 inches; sandy loam
2Bw2—28 to 35 inches; gravelly sandy loam
2C—35 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Merkel soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

308—Republic-Pelican complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,000 to 4,700 feet
Mean annual precipitation: 18 to 20 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Republic and similar soils: 55 percent
Pelican and similar soils: 35 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 5 percent

Republic and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes

Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks
Aspect, representative: Southwest
Aspect, range: Southeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 15 inches) over alluvium and glacial till
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass–bluebunch wheatgrass (CDG134)

Typical profile
A1—0 to 6 inches; ashy loam
A2—6 to 15 inches; ashy sandy loam
2Bw1—15 to 28 inches; sandy loam
2Bw2—28 to 35 inches; gravelly sandy loam
2C—35 to 60 inches; very gravelly sandy loam

Pelican and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southwest
Aspect, range: Southeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 25 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 35 to 50 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Mountain Park (R006XY702WA)

Typical profile
A—0 to 11 inches; gravelly ashy loam
2Bw1—11 to 18 inches; gravelly sandy loam
2Bw2—18 to 28 inches; very gravelly sandy loam
3C1—28 to 37 inches; very gravelly sandy loam

3C2—37 to 46 inches; very gravelly sandy loam
3Cd—46 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Rock outcrop
Composition: 5 percent

Use and Management

Major uses: Livestock grazing, timber production (Republic soil), recreation, watershed, and wildlife habitat

309—Resner ashy loam, 0 to 20 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 3,500 to 6,000 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 80 to 100 days

Map Unit Composition

Resner and similar soils: 100 percent

Resner and Similar Soils

Setting
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, the lower third of mountainflanks, and risers
Aspect, representative: North
Aspect, range: West to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 22 inches) over glacial outwash and glacial till
Slope: 0 to 20 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
A—0 to 5 inches; ashy loam
Bw—5 to 18 inches; ashy fine sandy loam
2C—18 to 60 inches; very cobbly loamy sand

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

310—Resner ashy loam, 20 to 40 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 3,500 to 6,000 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 80 to 100 days

Map Unit Composition

Resner and similar soils: 100 percent

Resner and Similar Soils

Setting
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, the lower third of mountainflanks, and risers
Aspect, representative: North
Aspect, range: Northwest to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 22 inches) over glacial outwash and glacial till
Slope: 20 to 40 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
A—0 to 5 inches; ashy loam
Bw—5 to 18 inches; ashy fine sandy loam
2C—18 to 60 inches; very cobbly loamy sand

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

311—Resner-Sitdown complex, 0 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 4,200 to 5,200 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Resner, cool, and similar soils: 55 percent
Sitdown, cold, and similar soils: 30 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Resner, Cool, and Similar Soils

Setting

Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, the lower third of mountainflanks, and treads
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities

Parent material: Volcanic ash (14 to 22 inches) over glacial outwash and glacial till
Slope: 0 to 15 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.7 inches)

Interpretive groups

Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/dwarf huckleberry (CES422)

Typical profile

C—0 to 1 inch; ashy silt loam
2A—1 to 5 inches; ashy fine sandy loam
2Bw—5 to 18 inches; ashy fine sandy loam
3C—18 to 60 inches; very cobbly loamy sand

Sitdown, Cold, and Similar Soils

Setting

Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Footslopes
Geomorphic position, three-dimensional: Mountainbases and treads
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities

Parent material: Volcanic ash (10 to 14 inches) over glacial outwash and glacial till
Slope: 0 to 15 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/dwarf huckleberry (CES422)

Typical profile
A—0 to 3 inches; gravelly ashy sandy loam
Bw—3 to 11 inches; gravelly ashy sandy loam
2C1—11 to 23 inches; extremely cobbly loamy sand
2C2—23 to 60 inches; extremely gravelly loamy sand

Named Dissimilar Minor Components

Manley soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

312—Resner-Sitdown complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 4,500 to 5,500 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Resner and similar soils: 50 percent
Sitdown and similar soils: 35 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Resner and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 22 inches) over glacial outwash and glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None

Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 5 inches; ashy fine sandy loam
2Bw—5 to 18 inches; ashy fine sandy loam
3C—18 to 60 inches; very cobbly loamy sand

Sitdown and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 14 inches) over glacial outwash and glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
A—0 to 3 inches; gravelly ashy sandy loam
Bw—3 to 11 inches; gravelly ashy sandy loam
2C1—11 to 23 inches; extremely cobbly loamy sand
2C2—23 to 60 inches; extremely gravelly loamy sand

Named Dissimilar Minor Components

Devore soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Manley soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

313—Resner-Sitdown complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 5,100 to 5,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Resner and similar soils: 45 percent
Sitdown and similar soils: 40 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Resner and Similar Soils

Setting
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, the lower third of mountainflanks, treads, and risers
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 22 inches) over glacial outwash and glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 5 inches; ashy fine sandy loam
2Bw—5 to 18 inches; ashy fine sandy loam
3C—18 to 60 inches; very cobbly loamy sand

Sitdown and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 14 inches) over glacial outwash and glacial till

Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
A—0 to 3 inches; gravelly ashy sandy loam
Bw—3 to 11 inches; gravelly ashy sandy loam
2C1—11 to 23 inches; extremely cobbly loamy sand
2C2—23 to 60 inches; extremely gravelly loamy sand

Named Dissimilar Minor Components

Devore soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Manley soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

314—Ret silt loam, 0 to 3 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 1,600 to 3,800 feet
Mean annual precipitation: 14 to 20 inches
Mean annual air temperature: 42 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Ret and similar soils: 100 percent

Ret and Similar Soils

Setting
Landform: Flood plains on low stream terraces
Geomorphic position, three-dimensional: Mountainbases and rises
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Alluvium
Slope: 0 to 3 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: Occasional (See Water Features table.)
Frequency of ponding: None
Seasonal high water table, minimum depth: 10 to 15 inches (See Water Features table.)
Available water capacity, entire profile: High (about 10.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 3w
Land capability classification, irrigated: 3w
Plant community classification: Douglas-fir/common snowberry (CDS633)

Typical profile
A1—0 to 8 inches; silt loam
A2—8 to 16 inches; loam
A3—16 to 22 inches; loam
Bw—22 to 30 inches; sandy loam
C1—30 to 36 inches; stratified gravelly coarse sand to silt loam
C2—36 to 60 inches; stratified gravelly coarse sand to silt loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

315—Riverwash-Water complex, 0 to 2 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope

Map Unit Composition

Riverwash: 75 percent
Water: 20 percent
Unnamed dissimilar minor components: 5 percent

Riverwash

Riverwash consists of recent alluvial deposits of sandy, silty, gravelly, and cobbly sediment. It is on flood plains that have slopes of less than 3 percent. It is subject to frequent flooding most of the year. It has a high water table throughout the year. The land capability classification is 8.

Water

The water component of the map unit consists of streams, rivers, lakes, and reservoirs. The areas are covered with water in most years. Depending on the time of year and the amount of spring runoff, the map unit boundary between water and adjacent map units can fluctuate. The land capability classification is 8.

Use and Management

Major uses: Some areas are suitable as a source of sand and gravel.

316—Rock outcrop-Donavan-Peka complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 1,800 to 4,500 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 90 to 130 days

Map Unit Composition

Rock outcrop: 35 percent
Donavan and similar soils: 30 percent
Peka and similar soils: 20 percent
Named dissimilar minor components: 15 percent

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Donavan and Similar Soils

Setting
Landform: Glaciated foothills; glaciated mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Center thirds of mountainflanks, lower thirds of mountainflanks, base slopes, side slopes, nose slopes, and head slopes
Aspect, representative: Northeast
Aspect, range: West to south (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 19 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately low
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: High (about 10.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Land capability classification, irrigated: 7e
Plant community classification: Ponderosa pine/bluebunch wheatgrass (CPG141)

Typical profile
A1—0 to 2 inches; ashy loam
A2—2 to 7 inches; ashy silt loam
Bw—7 to 20 inches; ashy loam
2Cd1—20 to 39 inches; gravelly silt loam
2Cd2—39 to 60 inches; gravelly sandy loam

Peka and Similar Soils

Setting
Landform: Mountains

Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: Northeast
Aspect, range: West to south (clockwise)

Properties and qualities
Parent material: Mixed volcanic rock (10 to 18 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Ponderosa pine/bluebunch wheatgrass (CPG141) and ponderosa pine–Douglas-fir/bluebunch wheatgrass (CDG311)

Typical profile
A1—0 to 6 inches; stony ashy sandy loam
A2—6 to 15 inches; gravelly ashy sandy loam
2Bw—15 to 24 inches; very cobbly sandy loam
2C—24 to 49 inches; very cobbly sandy loam
2Cd—49 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Conconully soils
Composition: 5 percent
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Side slopes

Lani soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Molson soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Vanbrunt soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

317—Rock outcrop-Lithic Eutrocryepts-Rubble land complex, 35 to 90 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 3—Olympic and Cascade Mountains
Elevation: 4,400 to 6,160 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Rock outcrop: 45 percent
Lithic Eutrocryepts, forested, xeric, and similar soils: 35 percent
Rubble land: 20 percent

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 90 percent. The land capability classification is 8.

Lithic Eutrocryepts, Forested, Xeric, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash or mixed volcanic ash (4 to 12 inches) over colluvium and residuum
Slope: 35 to 90 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Land capability classification, irrigated: 7e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry)/smooth woodrush (CES425)

Typical profile
A—0 to 4 inches; very stony ashy fine sandy loam
2Bw—4 to 10 inches; very stony fine sandy loam
2C—10 to 18 inches; extremely stony sandy loam
2R—18 to 22 inches; unweathered bedrock

Rubble Land

Rubble land consists of colluvial deposits of gravel, cobbles, stones, and boulders. Voids between the fragments contain little or no soil material. Slopes range from 35 to

90 percent. Rubble land is typically underlain by bedrock at a depth of more than 40 inches. The land capability classification is 8.

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

318—Rock outcrop-Rubble land complex, 5 to 100 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains and 6—Cascade Mountains, Eastern Slope

Map Unit Composition

Rock outcrop: 50 percent
Rubble land: 40 percent
Unnamed dissimilar minor components: 10 percent

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 5 to 100 percent. The land capability classification is 8.

Rubble Land

Rubble land consists of colluvial deposits of gravel, cobbles, stones, and boulders. Voids between the fragments contain little or no soil material. Slopes range from 5 to 100 percent. Rubble land is typically underlain by bedrock at a depth of more than 40 inches. The land capability classification is 8.

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

319—Rock outcrop-Wellie-Rubble land complex, 65 to 90 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,800 to 4,700 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 42 to 46 degrees F
Frost-free period: 95 to 120 days

Map Unit Composition

Rock outcrop: 40 percent
Wellie and similar soils: 30 percent
Rubble land: 20 percent
Named dissimilar minor components: 10 percent

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 65 to 90 percent. The land capability classification is 8.

Wellie and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Colluvium derived from granite
Slope: 65 to 90 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pachistima/pinegrass (CDS412)

Typical profile
A—0 to 3 inches; extremely stony loamy coarse sand
C1—3 to 16 inches; extremely cobbly loamy coarse sand
C2—16 to 60 inches; extremely cobbly loamy coarse sand

Rubble Land

Rubble land consists of colluvial deposits of gravel, cobbles, stones, and boulders. Voids between the fragments contain little or no soil material. Slopes range from 65 to 90 percent. Rubble land is typically underlain by bedrock at a depth of more than 40 inches. The land capability classification is 8.

Named Dissimilar Minor Components

Doe soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Lithic Haploxerepts
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, timber production (Wellie soil), recreation, watershed, and wildlife habitat

320—Rufus-Wynhoff-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,000 to 4,700 feet

Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 100 to 140 days

Map Unit Composition

Rufus and similar soils: 55 percent
Wynhoff and similar soils: 30 percent
Rock outcrop: 10 percent
Unnamed dissimilar minor components: 5 percent

Rufus and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Summits, shoulders, and backslopes
Geomorphic position, three-dimensional: Mountaintops and mountainflanks
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 20 inches) mixed with colluvium and residuum from granitic and metamorphic rocks
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Plant community classification: Ponderosa pine/bluebunch wheatgrass (CPG141)

Typical profile
A1—0 to 6 inches; stony ashy sandy loam
A2—6 to 14 inches; very channery ashy sandy loam
Bw—14 to 18 inches; extremely flaggy ashy sandy loam
2R—18 to 28 inches; unweathered bedrock

Wynhoff and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Colluvium and residuum from granite or metasedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Cool Stony 15+ P.Z. (R006XY203WA)

Typical profile
A1—0 to 5 inches; gravelly sandy loam
A2—5 to 9 inches; gravelly sandy loam
Bw—9 to 18 inches; very gravelly sandy loam
C—18 to 24 inches; extremely gravelly sandy loam
R—24 to 34 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Use and Management

Major uses: Livestock grazing, timber production (Rufus soil), recreation, watershed, and wildlife habitat

321—Sacheen loamy sand, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 3,100 to 3,600 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Sacheen and similar soils: 90 percent
Named dissimilar minor components: 10 percent

Sacheen and Similar Soils

Setting
Landform: Mountains, side slopes in drainageways, and outwash terraces
Geomorphic position, two-dimensional: Backslopes, footslopes, and toeslopes
Geomorphic position, three-dimensional: Mountainbases and risers
Aspect, representative: Southeast
Aspect, range: Northeast to south (clockwise)

Properties and qualities
Parent material: Glacial outwash or glaciofluvial deposits derived from granite
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655) and Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 5 inches; loamy sand
C1—5 to 15 inches; loamy sand
C2—15 to 60 inches; loamy sand

Named Dissimilar Minor Components

Wapal soils
Composition: 5 percent
Landform: Outwash terraces
Geomorphic position, three-dimensional: Treads and risers

Merkel soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Stapaloop soils
Composition: 2 percent
Landform: Terraces on mountains
Geomorphic position, two-dimensional: Toeslopes and footslopes
Geomorphic position, three-dimensional: Mountainbases, the lower third of mountainflanks, treads, and risers

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

322—Sacheen loamy sand, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 3,900 to 5,300 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Sacheen and similar soils: 85 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Sacheen and Similar Soils

Setting
Landform: Glacial terrace escarpments on mountains; glacial terrace escarpments on outwash terraces
Geomorphic position, two-dimensional: Backslopes, footslopes, and toeslopes
Geomorphic position, three-dimensional: Mountainbases and risers
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities
Parent material: Glacial outwash or glaciofluvial deposits derived from granite

Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 5 inches; loamy sand
C1—5 to 15 inches; loamy sand
C2—15 to 60 inches; loamy sand

Named Dissimilar Minor Components

Pebcreek soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

323—Salcreek ashy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,600 to 4,700 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Salcreek and similar soils: 85 percent
Named dissimilar minor components: 12 percent
Unnamed dissimilar minor components: 3 percent

Salcreek and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: East
Aspect, range: North to south (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (14 to 20 inches) over glacial till from metasedimentary rock
Slope: 15 to 35 percent

Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: High (about 9.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 6 inches; ashy loam
AB—6 to 13 inches; ashy loam
Bw—13 to 20 inches; gravelly ashy sandy loam
2Bt1—20 to 28 inches; gravelly sandy loam
2Bt2—28 to 35 inches; gravelly clay loam
2Bt3—35 to 44 inches; gravelly clay loam
2Bt4—44 to 60 inches; gravelly clay loam

Named Dissimilar Minor Components

Oxerine soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops

Rendovy soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

324—Salcreek ashy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,200 to 4,900 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Salcreek and similar soils: 85 percent
Named dissimilar minor components: 12 percent
Unnamed dissimilar minor components: 3 percent

Salcreek and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: East
Aspect, range: North to southeast (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (14 to 20 inches) over glacial till from metasedimentary rock
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: High (about 9.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 6 inches; ashy loam
AB—6 to 13 inches; ashy loam
Bw—13 to 20 inches; gravelly ashy sandy loam
2Bt1—20 to 28 inches; gravelly sandy loam
2Bt2—28 to 35 inches; gravelly clay loam
2Bt3—35 to 44 inches; gravelly clay loam
2Bt4—44 to 60 inches; gravelly clay loam

Named Dissimilar Minor Components

Oxerine soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops

Rendovy soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

325—Scheiner-Myerscreek complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,400 to 4,200 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Scheiner and similar soils: 55 percent
Myerscreek and similar soils: 30 percent
Named dissimilar minor components: 8 percent
Unnamed dissimilar minor components: 7 percent

Scheiner and Similar Soils

Setting
Landform: Glacial terrace escarpments; terrace escarpments
Geomorphic position, three-dimensional: Risers
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glaciofluvial material
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES342)

Typical profile
C—0 to 2 inches; ashy sandy loam
2A—2 to 7 inches; ashy sandy loam
2Bw—7 to 12 inches; ashy sandy loam
3BC—12 to 16 inches; loamy sand
3C1—16 to 48 inches; sand
3C2—48 to 60 inches; gravelly sand

Myerscreek and Similar Soils

Setting
Landform: Mountains; glacial moraines
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till

Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 35 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES342)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; ashy fine sandy loam
2Bw—4 to 12 inches; ashy fine sandy loam
3CB—12 to 31 inches; very gravelly sandy loam
3Cd1—31 to 46 inches; very gravelly sandy loam
3Cd2—46 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Manley soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases

Cryofluvents
Composition: 3 percent
Landform: Flood plains on low stream terraces in glacial-trough valley floors on mountains
Geomorphic position, two-dimensional: Toeslopes
Geomorphic position, three-dimensional: Mountainbases

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

326—Scoap gravelly ashy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 3,300 to 4,500 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 42 to 45 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Scoap and similar soils: 85 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Scoap and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 20 inches) over colluvium and glacial till derived from metamorphic rock
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/common snowberry (CDS636 and CDS633)

Typical profile
A1—0 to 7 inches; gravelly ashy loam
A2—7 to 20 inches; gravelly ashy sandy loam
2Bw—20 to 32 inches; very gravelly sandy loam
2BC—32 to 50 inches; very gravelly sandy loam
2C—50 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Mineral soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Nevine soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

327—Setill ashy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,200 to 4,000 feet

Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Setill and similar soils: 85 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Setill and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: Southeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 20 inches) over glacial till from volcanic and sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 35 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately low
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Ponderosa pine/bitterbrush/bluebunch wheatgrass (CPS241)

Typical profile
A1—0 to 6 inches; ashy loam
A2—6 to 10 inches; ashy loam
BA—10 to 19 inches; gravelly ashy loam
2Bt—19 to 26 inches; very gravelly loam
2Bdt1—26 to 38 inches; very gravelly clay loam
2Bdt2—38 to 60 inches; very gravelly clay loam

Named Dissimilar Minor Components

Nicmar soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

328—Setill-Johntom complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,000 to 4,400 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Setill and similar soils: 55 percent
Johntom and similar soils: 30 percent
Named dissimilar minor components: 3 percent
Unnamed dissimilar minor components: 12 percent

Setill and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 20 inches) over glacial till from volcanic and sedimentary rock
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 35 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately low
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Ponderosa pine/bitterbrush/bluebunch wheatgrass (CPS241)

Typical profile
A1—0 to 6 inches; ashy loam
A2—6 to 10 inches; ashy loam
BA—10 to 19 inches; gravelly ashy loam
2Bt—19 to 26 inches; very gravelly loam
2Bdt1—26 to 38 inches; very gravelly clay loam
2Bdt2—38 to 60 inches; very gravelly clay loam

Johntom and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Colluvium and residuum from mixed volcanic and sedimentary rocks
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 3 inches; gravelly loam
A2—3 to 12 inches; very flaggy loam
R—12 to 16 inches; unweathered bedrock

Named Dissimilar Minor Components

Rock outcrop
Composition: 3 percent

Use and Management

Major uses: Livestock grazing, timber production (Setill soil), recreation, watershed, and wildlife habitat

329—Shalrock-Johntom complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,400 to 4,800 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 40 to 50 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Shalrock, cool, and similar soils: 55 percent
Johntom and similar soils: 30 percent
Named dissimilar minor components: 8 percent
Unnamed dissimilar minor components: 7 percent

Shalrock, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 20 inches) over colluvium and residuum from volcanic and sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/mountain snowberry (CDS629)

Typical profile
A1—0 to 7 inches; very stony ashy sandy loam
A2—7 to 10 inches; gravelly ashy sandy loam
Bw—10 to 15 inches; very cobbly ashy sandy loam
2C—15 to 24 inches; extremely cobbly sandy loam
2R—24 to 28 inches; unweathered bedrock

Johntom and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Colluvium and residuum from mixed volcanic and sedimentary rocks
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 3 inches; gravelly loam
A2—3 to 12 inches; very flaggy loam
R—12 to 16 inches; unweathered bedrock

Named Dissimilar Minor Components

Radercreek soils
Composition: 8 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, timber production (Shalrock soil), recreation, watershed, and wildlife habitat

330—Shalrock-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,400 to 5,000 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Shalrock and similar soils: 50 percent
Rock outcrop: 35 percent
Named dissimilar minor components: 11 percent
Unnamed dissimilar minor components: 4 percent

Shalrock and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (7 to 20 inches) over colluvium and residuum from volcanic and sedimentary rock
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A1—0 to 7 inches; very stony ashy sandy loam
A2—7 to 10 inches; gravelly ashy sandy loam
Bw—10 to 15 inches; very cobbly ashy sandy loam
2C—15 to 24 inches; extremely cobbly sandy loam
2R—24 to 28 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Banker soils
Composition: 4 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, summits, and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Goshawk soils
Composition: 4 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and backslopes
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Santop soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

331—Shalrock-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,400 to 5,000 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Shalrock and similar soils: 60 percent
Rock outcrop: 25 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Shalrock and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 20 inches) over colluvium and residuum from volcanic and sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None

Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A1—0 to 7 inches; very stony ashy sandy loam
A2—7 to 10 inches; gravelly ashy sandy loam
Bw—10 to 15 inches; very cobbly ashy sandy loam
2C—15 to 24 inches; extremely cobbly sandy loam
2R—24 to 28 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Banker soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, summits, and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Nicmar soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

332—Shermount-Verhart complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 5,000 to 6,200 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Shermount and similar soils: 50 percent
Verhart and similar soils: 35 percent
Named dissimilar minor components: 7 percent
Unnamed dissimilar minor components: 8 percent

Shermount and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits

Geomorphic position, three-dimensional: Mountaintops
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 10 inches) over colluvium and residuum from granitic and metamorphic rocks
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: High Mountain Shallow (R006XY204WA)

Typical profile
A—0 to 6 inches; channery ashy loam
2C—6 to 18 inches; very channery loam
2R—18 to 22 inches; unweathered bedrock

Verhart and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium and residuum from sedimentary rock
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/pinegrass (CEG310)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw—4 to 11 inches; very gravelly ashy sandy loam
2C—11 to 24 inches; very gravelly sandy loam
2R—24 to 28 inches; unweathered bedrock

Named Dissimilar Minor Components

Finney soils
Composition: 5 percent

Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production (Verhart soil), recreation, watershed, and wildlife habitat

333—Shermount-Verhart complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 5,000 to 6,200 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Shermount and similar soils: 50 percent
Verhart and similar soils: 35 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Shermount and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 10 inches) over colluvium and residuum from granitic and metamorphic rocks
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: High Mountain Shallow (R006XY204WA)

Typical profile
A—0 to 6 inches; channery ashy loam
2C—6 to 18 inches; very channery loam
2R—18 to 22 inches; unweathered bedrock

Verhart and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium and residuum from sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/pinegrass (CEG310)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw—4 to 11 inches; very gravelly ashy sandy loam
2C—11 to 24 inches; very gravelly sandy loam
2R—24 to 28 inches; unweathered bedrock

Named Dissimilar Minor Components

Finney soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production (Verhart soil), recreation, watershed, and wildlife habitat

334—Sitdown stony ashy sandy loam, 0 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains; 6—Cascade Mountains, Eastern Slope; and 43A—Northern Rocky Mountains
Elevation: 5,000 to 6,200 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Sitdown, cool, and similar soils: 85 percent
Unnamed dissimilar minor components: 15 percent

Sitdown, Cool, and Similar Soils

Setting
Landform: Outwash terraces
Geomorphic position, three-dimensional: Treads
Aspect, representative: South
Aspect, range: Northeast to northwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 14 inches) over glacial outwash and glacial till
Slope: 0 to 15 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426) and subalpine fir/grouse blueberry (huckleberry) (CES412)

Typical profile
A—0 to 3 inches; stony ashy sandy loam
Bw—3 to 11 inches; gravelly ashy sandy loam
2C1—11 to 23 inches; extremely cobbly loamy sand
2C2—23 to 60 inches; extremely gravelly loamy sand

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

335—Sitdown stony ashy sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 5,500 to 6,200 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Sitdown, cool, and similar soils: 85 percent
Named dissimilar minor components: 8 percent
Unnamed dissimilar minor components: 7 percent

Sitdown, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (10 to 14 inches) over glacial outwash and glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
A—0 to 3 inches; stony ashy sandy loam
Bw—3 to 11 inches; gravelly ashy sandy loam
2C1—11 to 23 inches; extremely cobbly loamy sand
2C2—23 to 60 inches; extremely gravelly loamy sand

Named Dissimilar Minor Components

Myerscreek soils
Composition: 5 percent
Landform: Glacial moraines on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainflanks

Wellsfar soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

336—Sitdown-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 5,300 to 6,500 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Sitdown, cool, and similar soils: 60 percent
Rock outcrop: 20 percent
Named dissimilar minor components: 11 percent
Unnamed dissimilar minor components: 9 percent

Sitdown, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 14 inches) over glacial outwash and glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
A—0 to 3 inches; stony ashy sandy loam
Bw—3 to 11 inches; gravelly ashy sandy loam
2C1—11 to 23 inches; extremely cobbly loamy sand
2C2—23 to 60 inches; extremely gravelly loamy sand

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Devore soils
Composition: 6 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Myerscreek soils
Composition: 5 percent
Landform: Glacial moraines on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

337—Sitdown-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 4,500 to 5,500 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Sitdown and similar soils: 65 percent
Rock outcrop: 20 percent
Unnamed dissimilar minor components: 15 percent

Sitdown and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 14 inches) over glacial outwash and glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
A—0 to 3 inches; stony ashy sandy loam
Bw—3 to 11 inches; gravelly ashy sandy loam
2C1—11 to 23 inches; extremely cobbly loamy sand
2C2—23 to 60 inches; extremely gravelly loamy sand

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

338—Sitdown-Wellsfar-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 5,400 to 6,200 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Sitdown, cool, and similar soils: 45 percent
Wellsfar and similar soils: 30 percent
Rock outcrop: 10 percent
Unnamed dissimilar minor components: 15 percent

Sitdown, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 14 inches) over glacial outwash and glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
A—0 to 3 inches; stony ashy sandy loam
Bw—3 to 11 inches; gravelly ashy sandy loam
2C1—11 to 23 inches; extremely cobbly loamy sand
2C2—23 to 60 inches; extremely gravelly loamy sand

Wellsfar and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) mixed with colluvium and residuum derived from granite
Slope: 15 to 35 percent

Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 6s
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
A—0 to 3 inches; gravelly ashy sandy loam
Bw—3 to 8 inches; gravelly ashy sandy loam
2Bw—8 to 16 inches; very gravelly coarse sandy loam
2C—16 to 25 inches; very gravelly coarse sandy loam
2Cr—25 to 35 inches; weathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

339—Smokejump-Jantill complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 4,900 to 6,200 feet
Mean annual precipitation: 35 to 40 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 80 days

Map Unit Composition

Smokejump and similar soils: 60 percent
Jantill and similar soils: 25 percent
Named dissimilar minor components: 2 percent
Unnamed dissimilar minor components: 13 percent

Smokejump and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: Northwest
Aspect, range: Southwest to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from gneiss, granodiorite, and granite

Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/Cascade azalea (CES214)

Typical profile
A—0 to 4 inches; stony ashy fine sandy loam
Bw—4 to 13 inches; very stony ashy sandy loam
2C1—13 to 28 inches; very stony sandy loam
2C2—28 to 32 inches; extremely stony sandy loam
2R—32 to 36 inches; unweathered bedrock

Jantill and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes and footslopes
Geomorphic position, three-dimensional: Mountainbases
Aspect, representative: Northwest
Aspect, range: Southwest to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till and glacial outwash
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/Cascade azalea (CES214)

Typical profile
C—0 to 1 inch; stony ashy silt loam
2A—1 to 4 inches; stony ashy sandy loam
2Bw—4 to 11 inches; very stony loamy sand
3C1—11 to 27 inches; very stony loamy sand
3C2—27 to 60 inches; very gravelly loamy sand

Named Dissimilar Minor Components

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

340—Smokejump-Twentymile complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 4,800 to 6,800 feet
Mean annual precipitation: 35 to 40 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Smokejump and similar soils: 50 percent
Twentymile and similar soils: 30 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 10 percent

Smokejump and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from gneiss, granodiorite, and granite
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/Cascade azalea (CES214)

Typical profile
A—0 to 4 inches; stony ashy fine sandy loam
Bw—4 to 13 inches; very stony ashy sandy loam
2C1—13 to 28 inches; very stony sandy loam
2C2—28 to 32 inches; extremely stony sandy loam
2R—32 to 36 inches; unweathered bedrock

Twentymile and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 35 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/Cascade azalea (CES214)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; stony ashy fine sandy loam
2Bw—4 to 13 inches; gravelly ashy fine sandy loam
3CB—13 to 31 inches; very gravelly sandy loam
3Cd1—31 to 44 inches; very gravelly sandy loam
3Cd2—44 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Sitdown soils
Composition: 5 percent
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, risers, and treads

Treebutte soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

341—Springdale cobbly ashy coarse sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,200 to 3,700 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Springdale and similar soils: 85 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Springdale and Similar Soils

Setting

Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities

Parent material: Mixed volcanic ash (10 to 19 inches) over glacial outwash from granite
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification, nonirrigated: 4e
Plant community classification: Ponderosa pine/bitterbrush/bluebunch wheatgrass (CPS241)

Typical profile

A—0 to 3 inches; cobbly ashy coarse sandy loam
Bw—3 to 11 inches; gravelly ashy coarse sandy loam
2C1—11 to 24 inches; extremely gravelly loamy sand
2C2—24 to 60 inches; very gravelly coarse sand

Named Dissimilar Minor Components

Peka soils

Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

342—Springdale-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,800 to 3,800 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Springdale and similar soils: 70 percent
Rock outcrop: 15 percent

Named dissimilar minor components: 8 percent
Unnamed dissimilar minor components: 7 percent

Springdale and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 19 inches) over glacial outwash from granite
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Ponderosa pine/bitterbrush/bluebunch wheatgrass (CPS241)

Typical profile
A—0 to 3 inches; cobbly ashy coarse sandy loam
Bw—3 to 11 inches; gravelly ashy coarse sandy loam
2C1—11 to 24 inches; extremely gravelly loamy sand
2C2—24 to 60 inches; very gravelly coarse sand

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Vanbrunt soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Peka soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

343—Stapaloop ashy fine sandy loam, 0 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 3,400 to 4,800 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 95 to 120 days

Map Unit Composition

Stapaloop and similar soils: 85 percent
Named dissimilar minor components: 15 percent

Stapaloop and Similar Soils

Setting
Landform: Terraces on mountains
Geomorphic position, two-dimensional: Toeslopes and footslopes
Geomorphic position, three-dimensional: Mountainbases, the lower third of mountainflanks, treads, and risers
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (7 to 21 inches) over glaciofluvial deposits
Slope: 0 to 25 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 8.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/dwarf huckleberry (CDS831 and CDS813)

Typical profile
A—0 to 3 inches; ashy fine sandy loam
Bw1—3 to 13 inches; ashy fine sandy loam
Bw2—13 to 21 inches; ashy fine sandy loam
C1—21 to 34 inches; fine sandy loam
C2—34 to 50 inches; very fine sandy loam
C3—50 to 60 inches; very fine sandy loam

Named Dissimilar Minor Components

Louploup soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and toeslopes
Geomorphic position, three-dimensional: Lower third of mountainflanks; mountainbases

Merkel soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Torboy soils
Composition: 5 percent
Landform: Glacial terraces
Geomorphic position, three-dimensional: Treads and risers

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

344—Stemilt-Midpeak complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,250 to 4,100 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 100 to 120 days

Map Unit Composition

Stemilt and similar soils: 60 percent
Midpeak and similar soils: 25 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Stemilt and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Northeast
Aspect, range: Northwest to southeast (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 22 inches) over colluvium from volcanic and sedimentary rock
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A1—0 to 8 inches; gravelly ashy sandy loam
A2—8 to 13 inches; gravelly ashy sandy loam
Bw—13 to 22 inches; very gravelly ashy sandy loam
2Bt1—22 to 33 inches; very gravelly clay loam
2Bt2—33 to 46 inches; very gravelly clay loam
2Bt3—46 to 60 inches; very gravelly clay loam

Midpeak and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Northeast
Aspect, range: Northwest to southeast (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 15 inches) over colluvium and residuum from volcanic rock and sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A1—0 to 6 inches; gravelly ashy sandy loam
A2—6 to 15 inches; very gravelly ashy sandy loam
2Bw—15 to 23 inches; very gravelly sandy loam
2C—23 to 36 inches; extremely gravelly sandy loam
2R—36 to 40 inches; unweathered bedrock

Named Dissimilar Minor Components

Rock outcrop
Composition: 5 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

345—Stepstone ashy fine sandy loam, 3 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 3,200 to 5,000 feet
Mean annual precipitation: 20 to 24 inches

Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Stepstone and similar soils: 80 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 10 percent

Stepstone and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 24 inches) over glacial till from granite
Slope: 3 to 15 percent
Depth to restrictive feature: 14 to 36 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 3e
Plant community classification: Douglas-fir/dwarf huckleberry (CDS831 and CDS813)

Typical profile
A—0 to 1 inch; ashy fine sandy loam
Bw1—1 to 5 inches; ashy fine sandy loam
Bw2—5 to 18 inches; ashy fine sandy loam
2CB—18 to 22 inches; very gravelly sandy loam
2C1—22 to 38 inches; very gravelly loamy sand
2C2—38 to 60 inches; very gravelly loamy sand

Named Dissimilar Minor Components

Nevine soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Torboy soils
Composition: 5 percent
Landform: Glacial terraces
Geomorphic position, three-dimensional: Treads and risers

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

346—Stepstone ashy fine sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 3,200 to 5,000 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Stepstone, dry, and similar soils: 80 percent
Named dissimilar minor components: 15 percent
Unnamed dissimilar minor components: 5 percent

Stepstone, Dry, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 24 inches) over glacial till from granite
Slope: 15 to 35 percent
Depth to restrictive feature: 14 to 36 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 1 inch; ashy fine sandy loam
Bw1—1 to 5 inches; ashy fine sandy loam
Bw2—5 to 18 inches; ashy fine sandy loam
2CB—18 to 22 inches; very gravelly sandy loam
2C1—22 to 38 inches; very gravelly loamy sand
2C2—38 to 60 inches; very gravelly loamy sand

Named Dissimilar Minor Components

Merkel soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Mineral soils
Composition: 5 percent
Landform: Mountains

Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Nevine soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

347—Stepstone-Torboy complex, 0 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 3,100 to 5,000 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Stepstone and similar soils: 60 percent
Torboy and similar soils: 25 percent
Named dissimilar minor components: 9 percent
Unnamed dissimilar minor components: 6 percent

Stepstone and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (10 to 24 inches) over glacial till from granite
Slope: 3 to 15 percent
Depth to restrictive feature: 14 to 36 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/dwarf huckleberry (CDS831)

Typical profile
A—0 to 1 inch; ashy fine sandy loam
Bw1—1 to 5 inches; ashy fine sandy loam

Bw2—5 to 18 inches; ashy fine sandy loam
2CB—18 to 22 inches; very gravelly sandy loam
2C1—22 to 38 inches; very gravelly loamy sand
2C2—38 to 60 inches; very gravelly loamy sand

Torboy and Similar Soils

Setting
Landform: Glacial terraces on mountains
Geomorphic position, two-dimensional: Footslopes and toeslopes
Geomorphic position, three-dimensional: Mountainbases and treads
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (9 to 18 inches) over glacial outwash
Slope: 0 to 15 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/dwarf huckleberry (CDS831)

Typical profile
A—0 to 5 inches; ashy sandy loam
Bw1—5 to 10 inches; ashy sandy loam
Bw2—10 to 18 inches; ashy sandy loam
2C1—18 to 27 inches; loamy sand
2C2—27 to 37 inches; loamy sand
2C3—37 to 60 inches; gravelly loamy sand

Named Dissimilar Minor Components

Goddard soils
Composition: 4 percent
Landform: Outwash terraces
Geomorphic position, three-dimensional: Risers and treads

Parmenter soils
Composition: 3 percent
Landform: Glacial outwash terraces
Geomorphic position, three-dimensional: Treads and risers

Nevine soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

348—Storer-Swakane-Rock outcrop complex, 35 to 75 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,600 to 4,000 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Storer and similar soils: 55 percent
Swakane and similar soils: 25 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 7 percent
Unnamed dissimilar minor components: 3 percent

Storer and Similar Soils

Setting
Landform: Foothills
Geomorphic position, two-dimensional: Shoulders and backslopes
Geomorphic position, three-dimensional: Side slopes and head slopes
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Colluvium and residuum from metamorphic and metavolcanic rock
Slope: 35 to 75 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 5 inches; gravelly sandy loam
A2—5 to 12 inches; very gravelly sandy loam
Bw—12 to 19 inches; very gravelly sandy loam
C1—19 to 31 inches; extremely gravelly sandy loam
C2—31 to 42 inches; extremely channery sandy loam
R—42 to 46 inches; unweathered bedrock

Swakane and Similar Soils

Setting
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Nose slopes, side slopes, and head slopes
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 12 inches) over colluvium and residuum from granitic and metamorphic rocks
Slope: 35 to 75 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 4 inches; very stony ashy sandy loam
A2—4 to 11 inches; very gravelly ashy sandy loam
2Bw—11 to 17 inches; very gravelly sandy loam
2R—17 to 21 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 75 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Lithic Ultic Haploxerolls
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Wagberg soils
Composition: 2 percent
Landform: Glacial moraines

Wenner soils
Composition: 2 percent
Landform: Glacial terraces
Geomorphic position, three-dimensional: Treads and risers

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

349—Surgh very stony ashy sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,800 to 6,100 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 60 to 90 days

Map Unit Composition

Surgh and similar soils: 85 percent
Named dissimilar minor components: 13 percent
Unnamed dissimilar minor components: 2 percent

Surgh and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Northeast
Aspect, range: Northwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from granite and metamorphic rock
Slope: 15 to 35 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
C—0 to 1 inch; stony ashy fine sandy loam
2A—1 to 4 inches; very stony ashy sandy loam
2Bw1—4 to 12 inches; stony ashy sandy loam
3Bw2—12 to 18 inches; very cobbly sandy loam
3C1—18 to 32 inches; very cobbly coarse sandy loam
3C2—32 to 45 inches; very cobbly coarse sandy loam
3R—45 to 49 inches; unweathered bedrock

Named Dissimilar Minor Components

Devore soils
Composition: 4 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Treebutte soils
Composition: 4 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops

Myerscreek soils
Composition: 3 percent
Landform: Glacial moraines on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainflanks

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

350—Surgh very stony ashy sandy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,800 to 5,670 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 60 to 90 days

Map Unit Composition

Surgh and similar soils: 85 percent
Named dissimilar minor components: 12 percent
Unnamed dissimilar minor components: 3 percent

Surgh and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Northeast
Aspect, range: North to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from granite and metamorphic rock
Slope: 35 to 65 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
C—0 to 1 inch; stony ashy fine sandy loam
2A—1 to 4 inches; very stony ashy sandy loam
2Bw1—4 to 12 inches; stony ashy sandy loam
3Bw2—12 to 18 inches; very cobbly sandy loam
3C1—18 to 32 inches; very cobbly coarse sandy loam
3C2—32 to 45 inches; very cobbly coarse sandy loam
3R—45 to 49 inches; unweathered bedrock

Named Dissimilar Minor Components

Devore soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Treebutte soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

351—Surgh-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,800 to 5,670 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 60 to 90 days

Map Unit Composition

Surgh and similar soils: 70 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Surgh and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: Southwest to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from granite and metamorphic rock
Slope: 35 to 65 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
C—0 to 1 inch; stony ashy fine sandy loam
2A—1 to 4 inches; very stony ashy sandy loam
2Bw1—4 to 12 inches; stony ashy sandy loam
3Bw2—12 to 18 inches; very cobbly sandy loam
3C1—18 to 32 inches; very cobbly coarse sandy loam
3C2—32 to 45 inches; very cobbly coarse sandy loam
3R—45 to 49 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Devore soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Treebutte soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

352—Swakane-Peka-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 3,100 to 4,500 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Swakane and similar soils: 40 percent
Peka, moist, and similar soils: 30 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 4 percent
Unnamed dissimilar minor components: 11 percent

Swakane and Similar Soils

Setting
Landform: Foothills

Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Nose slopes, side slopes, and head slopes
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 12 inches) over colluvium and residuum from granitic and metamorphic rocks
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 4 inches; very stony ashy sandy loam
A2—4 to 11 inches; very gravelly ashy sandy loam
2Bw—11 to 17 inches; very gravelly sandy loam
2R—17 to 21 inches; unweathered bedrock

Peka, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic rock (10 to 18 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Ponderosa pine–Douglas-fir/bluebunch wheatgrass (CDG311) and ponderosa pine/bluebunch wheatgrass (CPG141)

Typical profile
A1—0 to 6 inches; stony ashy sandy loam
A2—6 to 15 inches; gravelly ashy sandy loam
2Bw—15 to 24 inches; very cobbly sandy loam
2C—24 to 49 inches; very cobbly sandy loam
2Cd—49 to 60 inches; very gravelly sandy loam

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Donovan soils
Composition: 4 percent

Use and Management

Major uses: Livestock grazing, timber production (Peka soil), recreation, watershed, and wildlife habitat

353—Swakane-Rock outcrop complex, 35 to 75 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,900 to 4,900 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Swakane and similar soils: 60 percent
Rock outcrop: 25 percent
Unnamed dissimilar minor components: 15 percent

Swakane and Similar Soils

Setting
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Nose slopes, side slopes, and head slopes
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 12 inches) over colluvium and residuum from granitic and metamorphic rocks
Slope: 35 to 75 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 4 inches; very stony ashy sandy loam
A2—4 to 11 inches; very gravelly ashy sandy loam
2Bw—11 to 17 inches; very gravelly sandy loam
2R—17 to 21 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 75 percent. The land capability classification is 8.

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

354—Swakane-Rock outcrop-Peka complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 3,100 to 4,500 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Swakane and similar soils: 40 percent
Rock outcrop: 30 percent
Peka, moist, and similar soils: 20 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 5 percent

Swakane and Similar Soils

Setting
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Nose slopes, side slopes, and head slopes
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 12 inches) over colluvium and residuum from granitic and metamorphic rocks
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 4 inches; very stony ashy sandy loam
A2—4 to 11 inches; very gravelly ashy sandy loam
2Bw—11 to 17 inches; very gravelly sandy loam
2R—17 to 21 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Peka, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic rock (10 to 18 inches) over glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Ponderosa pine–Douglas-fir/bluebunch wheatgrass (CDG311) and ponderosa pine/bluebunch wheatgrass (CPG141)

Typical profile
A1—0 to 6 inches; stony ashy sandy loam
A2—6 to 15 inches; gravelly ashy sandy loam
2Bw—15 to 24 inches; very cobbly sandy loam
2C—24 to 49 inches; very cobbly sandy loam
2Cd—49 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Donovan soils
Composition: 5 percent

Use and Management

Major uses: Livestock grazing, timber production (Peka soil), recreation, watershed, and wildlife habitat

355—Sycreek ashy loam, 5 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,800 to 4,600 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Sycreek and similar soils: 90 percent
Unnamed dissimilar minor components: 10 percent

Sycreek and Similar Soils

Setting

Landform: Gently sloping to steep side slopes in drainageways on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities

Parent material: Mixed volcanic ash (7 to 15 inches) over glacial till from volcanic and sedimentary rock
Slope: 5 to 35 percent
Depth to restrictive feature: 35 to 45 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately low
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/common snowberry (CDS636)

Typical profile

A—0 to 6 inches; ashy loam
AB—6 to 14 inches; ashy loam
2Bt1—14 to 25 inches; very gravelly sandy clay loam
2Bt2—25 to 42 inches; very gravelly sandy clay loam
3Cd—42 to 60 inches; very gravelly clay loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

356—Thout-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 3,400 to 5,200 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Thout and similar soils: 70 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 6 percent
Unnamed dissimilar minor components: 9 percent

Thout and Similar Soils

Setting

Landform: Mountains

Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: East
Aspect, range: North to south (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium and residuum from volcanic and sedimentary rock
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw1—4 to 11 inches; very gravelly ashy sandy loam
2Bw2—11 to 24 inches; very gravelly sandy loam
2R—24 to 28 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Longort soils
Composition: 6 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

357—Thout-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,400 to 5,200 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Thout and similar soils: 65 percent
Rock outcrop: 20 percent

Named dissimilar minor components: 6 percent
Unnamed dissimilar minor components: 9 percent

Thout and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: West
Aspect, range: Southeast to northeast (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium and residuum from volcanic and sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw1—4 to 11 inches; very gravelly ashy sandy loam
2Bw2—11 to 24 inches; very gravelly sandy loam
2R—24 to 28 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Longort soils
Composition: 6 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

358—Thout-Rock outcrop complex, cool, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,700 to 3,800 feet

Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Thout, cool, and similar soils: 70 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 15 percent

Thout, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium and residuum from volcanic and sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/mountain snowberry (CDS629)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
2Bw1—4 to 11 inches; very gravelly ashy sandy loam
2Bw2—11 to 24 inches; very gravelly ashy sandy loam
R—24 to 28 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Baldknob soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Johntom soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Scoap soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

359—Thow-Vingulch complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,700 to 5,200 feet
Mean annual precipitation: 20 to 25 inches
Mean annual air temperature: 40 to 45 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Thow and similar soils: 50 percent
Vingulch and similar soils: 35 percent
Unnamed dissimilar minor components: 15 percent

Thow and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash and pumice
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: High (about 10.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pachistima/pinegrass (CDS412)

Typical profile
C—0 to 5 inches; ashy loamy fine sand
2A—5 to 11 inches; ashy sandy loam
2Bw1—11 to 37 inches; paragravelly ashy coarse sandy loam
2Bw2—37 to 52 inches; paragravelly ashy loamy coarse sand
2Bw3—52 to 60 inches; paragravelly ashy loamy sand

Vingulch and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash and pumice (20 to 35 inches) over colluvium and residuum from volcanic and sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pachistima/pinegrass (CDS412)

Typical profile
C—0 to 3 inches; ashy loamy very fine sand
2A—3 to 11 inches; ashy coarse sandy loam
2Bw1—11 to 21 inches; paragravelly ashy coarse sandy loam
2Bw2—21 to 27 inches; paragravelly ashy coarse sandy loam
2C1—27 to 33 inches; paragravelly ashy loamy coarse sand
3C2—33 to 38 inches; very gravelly sandy loam
3R—38 to 42 inches; unweathered bedrock

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

360—Thowson ashy coarse sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,200 to 3,400 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Thowson and similar soils: 85 percent
Unnamed dissimilar minor components: 15 percent

Thowson and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes

Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash and pumice
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 8.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Ponderosa pine/bitterbrush/bluebunch wheatgrass (CPS241)

Typical profile
A—0 to 7 inches; ashy coarse sandy loam
Bw1—7 to 21 inches; paragravelly ashy coarse sandy loam
Bw2—21 to 33 inches; paragravelly ashy coarse sandy loam
Bw3—33 to 42 inches; paragravelly ashy coarse sandy loam
2Bw4—42 to 60 inches; gravelly ashy coarse sandy loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

361—Thrapp-Aquandic Xerofluvents complex, 0 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,000 to 3,800 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Thrapp and similar soils: 65 percent
Aquandic Xerofluvents and similar soils: 20 percent
Unnamed dissimilar minor components: 15 percent

Thrapp and Similar Soils

Setting
Landform: Side slopes in drainageways on mountains
Geomorphic position, two-dimensional: Toeslopes
Geomorphic position, three-dimensional: Mountainbases
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (10 to 15 inches) over glacial till
Slope: 5 to 35 percent
Depth to restrictive feature: 35 to 45 inches to dense material
Drainage class: Moderately well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: Rare (See Water Features table.)
Frequency of ponding: None
Seasonal high water table, minimum depth: About 36 to 45 inches (See Water Features table.)
Available water capacity, entire profile: Moderate (about 6.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/common snowberry (CDS636)

Typical profile
A1—0 to 4 inches; ashy loam
A2—4 to 12 inches; ashy loam
2Bw—12 to 22 inches; sandy loam
2C1—22 to 29 inches; gravelly sandy loam
2C2—29 to 36 inches; gravelly sandy loam
2Cd—36 to 60 inches; gravelly sandy loam

Aquandic Xerofluvents and Similar Soils

Setting
Landform: Flood plains on low stream terraces; bottoms of drainageways
Geomorphic position, two-dimensional: Toeslopes
Geomorphic position, three-dimensional: Mountainbases, rises, dips, and talfs
Down-slope shape: Concave
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over alluvium
Slope: 0 to 5 percent
Depth to restrictive feature: 40 to 60 inches to strongly contrasting textural stratification
Drainage class: Somewhat poorly drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: Occasional (See Water Features table.)
Frequency of ponding: None
Seasonal high water table, minimum depth: About 24 to 48 inches (See Water Features table.)
Available water capacity, entire profile: Moderate (about 6.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 3w
Plant community classification: Douglas-fir/common snowberry, flood plain, riparian (CDS628)

Typical profile
A—0 to 4 inches; ashy sandy loam
C—4 to 8 inches; ashy sandy loam
Ab—8 to 13 inches; ashy sandy loam
2C1—13 to 24 inches; stratified gravelly coarse sand to sandy loam
2C2—24 to 44 inches; stratified very gravelly coarse sand to sandy loam
2C3—44 to 50 inches; stratified very gravelly coarse sand to sandy loam
2C4—50 to 60 inches; stratified very gravelly coarse sand to sandy loam

Use and Management

Major uses: Timber production (Thrapp soil), recreation, watershed, and wildlife habitat

362—Thuso ashy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 2,200 to 3,700 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Thuso and similar soils: 85 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Thuso and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 25 inches) over colluvium from metasedimentary rock
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 12 inches; ashy loam
A2—12 to 25 inches; gravelly ashy sandy loam
2Bw—25 to 37 inches; very cobbly sandy loam
2C—37 to 61 inches; very cobbly sandy loam

Named Dissimilar Minor Components

Conconcully soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes
Geomorphic position, three-dimensional: Mountainbases

Lithic Haploxerepts
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

363—Thuso ashy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 2,200 to 3,700 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Thuso, cool, and similar soils: 85 percent
Named dissimilar minor components: 12 percent
Unnamed dissimilar minor components: 3 percent

Thuso, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southwest
Aspect, range: Southeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 25 inches) over colluvium from metasedimentary rock
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Cool Stony 15+ P.Z. (R006XY203WA)

Typical profile
A1—0 to 12 inches; ashy loam
A2—12 to 25 inches; gravelly ashy sandy loam
2Bw—25 to 37 inches; very cobbly sandy loam
2C—37 to 61 inches; very cobbly sandy loam

Named Dissimilar Minor Components

Conconcully soils
Composition: 4 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes
Geomorphic position, three-dimensional: Mountainbases

Lithic Haploxerepts
Composition: 4 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Rock outcrop
Composition: 4 percent

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

364—Thuso ashy sandy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,200 to 3,700 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Thuso, cool, and similar soils: 85 percent
Named dissimilar minor components: 11 percent
Unnamed dissimilar minor components: 4 percent

Thuso, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Northeast
Aspect, range: North to east (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 25 inches) over colluvium from metasedimentary rock
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Cool Stony 15+ P.Z. (R006XY203WA)

Typical profile
A1—0 to 12 inches; ashy sandy loam
A2—12 to 25 inches; gravelly ashy sandy loam
2Bw—25 to 37 inches; very cobbly sandy loam
2C—37 to 61 inches; very cobbly sandy loam

Named Dissimilar Minor Components

Wynhoff soils
Composition: 9 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

365—Thuso-Lithic Haploxerepts-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 2,200 to 4,700 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Thuso and similar soils: 35 percent
Lithic Haploxerepts, range, moist, and similar soils: 30 percent
Rock outcrop: 20 percent
Named dissimilar minor components: 7 percent
Unnamed dissimilar minor components: 8 percent

Thuso and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 25 inches) over colluvium from metasedimentary rock
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None

Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 12 inches; cobbly ashy sandy loam
A2—12 to 25 inches; gravelly ashy sandy loam
2Bw—25 to 37 inches; very cobbly sandy loam
2C—37 to 61 inches; very cobbly sandy loam

Lithic Haploxerepts, Range, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over bedrock
Slope: 35 to 65 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Dry Stony 15+ P.Z. (R006XY201WA)

Typical profile
A—0 to 3 inches; cobbly ashy sandy loam
Bw—3 to 12 inches; cobbly ashy sandy loam
2C—12 to 18 inches; very gravelly sandy loam
2R—18 to 22 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Conconcully soils
Composition: 7 percent
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Side slopes

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

366—Toats-Longswamp complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,600 to 5,500 feet
Mean annual precipitation: 25 to 30 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Toats and similar soils: 55 percent
Longswamp, cold, and similar soils: 30 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Toats and Similar Soils

Setting

Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities

Parent material: Mixed volcanic ash (12 to 14 inches) over glacial till from granite and metamorphic rock
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification, nonirrigated: 6e
Ecological site: High Mountain Park (R006XY703WA)

Typical profile

A1—0 to 5 inches; ashy loam
A2—5 to 14 inches; ashy loam
2Bw—14 to 23 inches; very cobbly loam
2C1—23 to 40 inches; very stony sandy loam
2C2—40 to 52 inches; extremely stony sandy loam
2C3—52 to 60 inches; very stony sandy loam

Longswamp, Cold, and Similar Soils

Setting

Landform: Gently sloping side slopes of drainageways; mountains
Geomorphic position, two-dimensional: Footslopes
Geomorphic position, three-dimensional: Mountainbases
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (15 to 20 inches) over alluvium and glacial till
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Moderately well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: 24 to 45 inches (See Water Features table.)
Available water capacity, entire profile: High (about 9.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Quaking aspen/pinegrass (HQG111)

Typical profile
A1—0 to 7 inches; ashy loam
A2—7 to 20 inches; ashy loam
2AC—20 to 25 inches; cobbly sandy clay loam
2C—25 to 39 inches; gravelly sandy clay loam
3Cg—39 to 60 inches; gravelly silt loam

Named Dissimilar Minor Components

Myerscreek soils
Composition: 5 percent
Landform: Glacial moraines on mountains
Geomorphic position, two-dimensional: Backslopes, footslopes, and toeslopes
Geomorphic position, three-dimensional: Mountainflanks

Crocamp soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Burget soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

367—Togo ashy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 4,000 to 6,500 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 37 to 39 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Togo and similar soils: 100 percent

Togo and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes, backslopes, and shoulders
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Aspect, representative: Northeast
Aspect, range: North to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 20 inches) over colluvium, residuum, and glacial till from granite
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
A1—0 to 4 inches; ashy loam
Bw1—4 to 15 inches; ashy loam
Bw2—15 to 28 inches; very gravelly ashy loam
2C1—28 to 60 inches; very gravelly sandy loam
2C2—60 to 65 inches; extremely gravelly sandy loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

368—Togo ashy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 4,000 to 6,500 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 37 to 39 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Togo and similar soils: 100 percent

Togo and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes, backslopes, and shoulders
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Aspect, representative: North
Aspect, range: West to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 20 inches) over colluvium, residuum, and glacial till from granite
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
A—0 to 4 inches; ashy loam
Bw1—4 to 15 inches; ashy loam
Bw2—15 to 28 inches; very gravelly ashy loam
2C1—28 to 60 inches; very gravelly sandy loam
2C2—60 to 65 inches; extremely gravelly sandy loam

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

369—Togo-Bamber complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 4,000 to 6,500 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 37 to 39 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Togo and similar soils: 60 percent
Bamber and similar soils: 40 percent

Togo and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes, backslopes, and shoulders
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Aspect, representative: Southwest
Aspect, range: Southeast to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 20 inches) over colluvium, residuum, and glacial till from granite
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches

Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
A—0 to 4 inches; ashy loam
Bw1—4 to 15 inches; ashy loam
Bw2—15 to 28 inches; very gravelly ashy loam
2C1—28 to 60 inches; very gravelly sandy loam
2C2—60 to 65 inches; extremely gravelly sandy loam

Bamber and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks
Aspect, representative: Southwest
Aspect, range: Southeast to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (40 to 60 inches) over bedrock
Slope: 35 to 65 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
C—0 to 7 inches; ashy loam
Bw1—7 to 11 inches; gravelly ashy loam
Bw2—11 to 18 inches; gravelly ashy loam
BC—18 to 42 inches; extremely gravelly ashy loam
2R—42 to 46 inches; unweathered bedrock

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

370—Togo-Rock outcrop complex, 15 to 50 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains

Elevation: 4,000 to 6,500 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 37 to 39 degrees F
Frost-free period: 70 to 100 days

Map Unit Composition

Togo and similar soils: 60 percent
Rock outcrop: 40 percent

Togo and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes, backslopes, and shoulders
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Aspect, representative: Northeast
Aspect, range: North to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 20 inches) over colluvium, residuum, and glacial till from granite
Slope: 15 to 40 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/blue (big) huckleberry (CES313)

Typical profile
A—0 to 4 inches; ashy loam
Bw1—4 to 15 inches; ashy loam
Bw2—15 to 28 inches; very gravelly ashy loam
2C1—28 to 60 inches; very gravelly sandy loam
2C2—60 to 65 inches; extremely gravelly sandy loam

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 50 percent. The land capability classification is 8.

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

371—Torboy cobbly ashy sandy loam, 25 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 3,000 to 4,500 feet

Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Torboy, warm, and similar soils: 100 percent

Torboy, Warm, and Similar Soils

Setting
Landform: Glacial terraces
Geomorphic position, three-dimensional: Risers
Aspect, representative: Southeast
Aspect, range: Northeast to south (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (9 to 18 inches) over glacial outwash
Slope: 25 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/ninebark (CDS715)

Typical profile
A—0 to 5 inches; cobbly ashy sandy loam
Bw1—5 to 10 inches; ashy sandy loam
Bw2—10 to 18 inches; ashy sandy loam
2C1—18 to 27 inches; gravelly loamy sand
2C2—27 to 37 inches; gravelly loamy sand
2C3—37 to 60 inches; gravelly loamy sand

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

372—Twentymile ashy fine sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 4,900 to 5,600 feet
Mean annual precipitation: 35 to 40 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Twentymile and similar soils: 85 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Twentymile and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: North
Aspect, range: West to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 35 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/Cascade azalea (CES214)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; ashy fine sandy loam
2Bw—4 to 13 inches; gravelly ashy fine sandy loam
3CB—13 to 31 inches; very gravelly sandy loam
3Cd1—31 to 44 inches; very gravelly sandy loam
3Cd2—44 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Sitdown soils
Composition: 3 percent
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, risers, and treads

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

373—Vallan-Rock outcrop complex, 15 to 50 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 3,000 to 5,500 feet
Mean annual precipitation: 15 to 25 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 70 to 120 days

Map Unit Composition

Vallan and similar soils: 60 percent
Rock outcrop: 40 percent

Vallan and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: Southwest
Aspect, range: East to northwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (1 to 3 inches) over colluvium and residuum from rhyodacite and andesite
Slope: 15 to 50 percent
Depth to restrictive feature: 6 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Ecological site: Dry Stony 15+ P.Z. (R043AY201WA)

Typical profile
A—0 to 2 inches; ashy loam
2Bw—2 to 10 inches; loam
2Bt—10 to 16 inches; gravelly loam
2R—16 to 20 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 50 percent. The land capability classification is 8.

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

374—Vanbrunt-Swakane-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 2,200 to 4,600 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Vanbrunt and similar soils: 55 percent
Swakane and similar soils: 20 percent

Rock outcrop: 10 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Vanbrunt and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 19 inches) over colluvium and residuum from granite
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Ponderosa pine–Douglas-fir/bluebunch wheatgrass (CDG311) and ponderosa pine/bitterbrush/bluebunch wheatgrass (CPS241)

Typical profile
A1—0 to 7 inches; stony ashy sandy loam
A2—7 to 12 inches; very cobbly ashy sandy loam
Bw—12 to 19 inches; very cobbly ashy sandy loam
2C—19 to 25 inches; very cobbly sandy loam
2R—25 to 29 inches; unweathered bedrock

Swakane and Similar Soils

Setting
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Nose slopes, side slopes, and head slopes
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 12 inches) over colluvium and residuum from granitic and metamorphic rocks
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 4 inches; very stony ashy sandy loam
A2—4 to 11 inches; very gravelly ashy sandy loam
2Bw—11 to 17 inches; very gravelly sandy loam
2R—17 to 21 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Springdale soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production (Vanbrunt soil), recreation, watershed, and wildlife habitat

375—Venson gravelly ashy sandy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 4,800 to 6,500 feet
Mean annual precipitation: 35 to 40 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Venson and similar soils: 80 percent
Named dissimilar minor components: 15 percent
Unnamed dissimilar minor components: 5 percent

Venson and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Northwest
Aspect, range: Southwest to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum derived from sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None

Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/Cascade azalea (CES214)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw—4 to 11 inches; gravelly ashy sandy loam
2C1—11 to 28 inches; very gravelly sandy loam
2C2—28 to 38 inches; extremely gravelly sandy loam
2R—38 to 42 inches; unweathered bedrock

Named Dissimilar Minor Components

Gatewall soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Volmont soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Summits, shoulders, and backslopes
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Finney soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

376—Verhart-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 5,500 to 6,600 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Verhart and similar soils: 55 percent
Rock outcrop: 30 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Verhart and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium and residuum from sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Plant community classification: Subalpine fir/pinegrass (CEG310)

Typical profile
A—0 to 4 inches; stony ashy sandy loam
Bw—4 to 11 inches; very gravelly ashy sandy loam
2C—11 to 24 inches; very gravelly sandy loam
2R—24 to 28 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Shermount soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

377—Verhart-Rock outcrop complex, cold, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 5,700 to 6,600 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Verhart, cold, and similar soils: 55 percent
Rock outcrop: 30 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Verhart, Cold, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium and residuum from sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Plant community classification: Whitebark pine/pinegrass (CAG112)

Typical profile
A—0 to 4 inches; stony ashy sandy loam
Bw—4 to 11 inches; very gravelly ashy sandy loam
2C—11 to 24 inches; very gravelly sandy loam
2R—24 to 28 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Shermount soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

378—Veridge-Farway complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,300 to 4,900 feet

Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Veridge and similar soils: 55 percent
Farway and similar soils: 25 percent
Named dissimilar minor components: 14 percent
Unnamed dissimilar minor components: 6 percent

Veridge and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: North
Aspect, range: West to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw—4 to 12 inches; gravelly ashy sandy loam
2CB—12 to 21 inches; very gravelly sandy loam
2C—21 to 30 inches; very cobbly sandy loam
2R—30 to 34 inches; unweathered bedrock

Farway and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: North
Aspect, range: West to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (16 to 30 inches) over colluvium and glacial till from volcanic and sedimentary rock
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None

Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw1—4 to 9 inches; gravelly ashy sandy loam
Bw2—9 to 20 inches; gravelly ashy sandy loam
2C—20 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Finney soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Stapaloop soils
Composition: 5 percent
Landform: Terraces on mountains
Geomorphic position, two-dimensional: Toeslopes and footslopes
Geomorphic position, three-dimensional: Mountainbases, the lower third of mountainflanks, treads, and risers

Rock outcrop
Composition: 2 percent

Shalrock soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

379—Veridge-Farway complex, moist, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,300 to 4,600 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Veridge, moist, and similar soils: 55 percent
Farway, moist, and similar soils: 30 percent
Named dissimilar minor components: 13 percent
Unnamed dissimilar minor components: 2 percent

Veridge, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: North
Aspect, range: West to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pachistima/pinegrass (CDS412)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw—4 to 12 inches; gravelly ashy sandy loam
2CB—12 to 21 inches; very gravelly sandy loam
2C—21 to 30 inches; very cobbly sandy loam
2R—30 to 34 inches; unweathered bedrock

Farway, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: North
Aspect, range: West to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (16 to 30 inches) over colluvium and glacial till from volcanic and sedimentary rock
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pachistima/pinegrass (CDS412)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw1—4 to 9 inches; gravelly ashy sandy loam

Bw2—9 to 20 inches; gravelly ashy sandy loam
2C—20 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Yellcreek soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Santop soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Shalrock soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

380—Veridge-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,800 to 4,800 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 115 days

Map Unit Composition

Veridge and similar soils: 60 percent
Rock outcrop: 25 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Veridge and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: North
Aspect, range: West to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from sedimentary rock

Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw—4 to 12 inches; gravelly ashy sandy loam
2CB—12 to 21 inches; very gravelly sandy loam
2C—21 to 30 inches; very cobbly sandy loam
2R—30 to 34 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Johntom soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Redpeak soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

381—Vinegar ashy sandy loam, 0 to 5 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,200 to 2,400 feet
Mean annual precipitation: 20 to 25 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Vinegar and similar soils: 85 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Vinegar and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash and pumice more than 60 inches deep
Slope: 0 to 5 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: High (about 11.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 3e
Plant community classification: Douglas-fir/pachistima/pinegrass (CDS412)

Typical profile
A—0 to 5 inches; ashy sandy loam
Bw1—5 to 15 inches; ashy coarse sandy loam
Bw2—15 to 33 inches; paragravelly ashy coarse sandy loam
Bw3—33 to 60 inches; paragravelly ashy coarse sandy loam

Named Dissimilar Minor Components

Thow soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Thowson soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

382—Vinegar-Thow complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,700 to 5,200 feet
Mean annual precipitation: 20 to 25 inches
Mean annual air temperature: 40 to 45 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Vinegar and similar soils: 50 percent
Thow and similar soils: 35 percent
Unnamed dissimilar minor components: 15 percent

Vinegar and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks
Aspect, representative: North
Aspect, range: Southwest to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash and pumice more than 60 inches deep
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: High (about 11.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/pachistima/pinegrass (CDS412)

Typical profile
A—0 to 5 inches; ashy sandy loam
Bw1—5 to 15 inches; ashy coarse sandy loam
Bw2—15 to 33 inches; paragravelly ashy coarse sandy loam
Bw3—33 to 60 inches; paragravelly ashy coarse sandy loam

Thow and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: North
Aspect, range: Southwest to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash and pumice
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: High (about 10.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pachistima/pinegrass (CDS412)

Typical profile
C—0 to 5 inches; ashy loamy fine sand
2A—5 to 11 inches; ashy sandy loam
2Bw1—11 to 37 inches; paragravelly ashy coarse sandy loam
2Bw2—37 to 52 inches; paragravelly ashy loamy coarse sand
2Bw3—52 to 60 inches; paragravelly ashy loamy sand

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

383—Vingulch-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 1,400 to 5,300 feet
Mean annual precipitation: 20 to 25 inches
Mean annual air temperature: 40 to 45 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Vingulch and similar soils: 75 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 15 percent

Vingulch and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash and pumice (20 to 35 inches) over colluvium and residuum from volcanic and sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pachistima/pinegrass (CDS412)

Typical profile
C—0 to 3 inches; ashy loamy very fine sand
2A—3 to 11 inches; ashy coarse sandy loam
2Bw1—11 to 21 inches; paragravelly ashy coarse sandy loam
2Bw2—21 to 27 inches; paragravelly ashy coarse sandy loam

2C1—27 to 33 inches; paragravelly ashy loamy coarse sand
3C2—33 to 38 inches; very gravelly sandy loam
3R—38 to 42 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Leftcreek soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Thow soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Vinegar soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

384—Vitrandic Dystrocryepts-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 6,600 to 8,000 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Vitrandic Dystrocryepts, udic, nonforested, and similar soils: 65 percent
Rock outcrop: 25 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 5 percent

Vitrandic Dystrocryepts, Udic, Nonforested, and Similar Soils

Setting
Landform: Mountains; basins and headwalls of cirques
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountaintops and mountainflanks
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 25 inches) over colluvium and residuum from mixed rock sources
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Ecological site: Subalpine Park (R006XY704WA)

Typical profile
A1—0 to 4 inches; stony ashy sandy loam
A2—4 to 12 inches; gravelly ashy sandy loam
Bw—12 to 20 inches; very gravelly ashy sandy loam
2C—20 to 31 inches; extremely gravelly sandy loam
2R—31 to 35 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Lithic Dystrocryepts
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

385—Vitrandic Dystrocryepts-Rock outcrop complex, 35 to 90 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 6,600 to 8,000 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Vitrandic Dystrocryepts, udic, nonforested, and similar soils: 60 percent
Rock outcrop: 25 percent
Named dissimilar minor components: 8 percent
Unnamed dissimilar minor components: 7 percent

Vitrandic Dystrocryepts, Udic, Nonforested, and Similar Soils

Setting

Landform: Avalanche chutes on mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks, mountainbases, and mountaintops
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities

Parent material: Mixed volcanic ash (7 to 25 inches) over colluvium and residuum from mixed rock sources
Slope: 35 to 90 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.7 inches)

Interpretive groups

Land capability classification, nonirrigated: 7e
Ecological site: Subalpine Park (R006XY704WA) (fig. 5)

Typical profile

A1—0 to 4 inches; stony ashy fine sandy loam
A2—4 to 12 inches; gravelly ashy sandy loam
Bw—12 to 20 inches; very gravelly ashy sandy loam
2C—20 to 31 inches; extremely gravelly sandy loam
2R—31 to 35 inches; unweathered bedrock

Figure 5.—Typical landscape in an area of Vitrandic Dystrocryepts-Rock outcrop complex, 35 to 90 percent slopes. The ecological site is Subalpine Park and is dominated by pink mountainheath.

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 90 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Lithic Dystrocryepts
Composition: 8 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

386—Vitrandic Eutrocryepts-Cryaquolls complex, 0 to 5 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 4,400 to 5,100 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Vitrandic Eutrocryepts, xeric, forested, and similar soils: 60 percent
Cryaquolls, somewhat poorly drained, till substratum, and similar soils: 30 percent
Unnamed dissimilar minor components: 10 percent

Vitrandic Eutrocryepts, Xeric, Forested, and Similar Soils

Setting
Landform: Outwash terraces
Geomorphic position, three-dimensional: Treads
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (7 to 21 inches) over glacial outwash and glacial till
Slope: 0 to 5 percent
Depth to restrictive feature: 12 to 25 inches to strongly contrasting textural stratification
Drainage class: Moderately well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: Rare (See Water Features table.)
Frequency of ponding: None
Seasonal high water table, minimum depth: About 30 to 48 inches (See Water Features table.)
Available water capacity, entire profile: Low (about 6.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 6w
Plant community classification: Subalpine fir/twinflower (CEF211 and CEF222)

Typical profile
A—0 to 3 inches; ashy fine sandy loam
Bw1—3 to 11 inches; ashy fine sandy loam
Bw2—11 to 20 inches; ashy fine sandy loam
2C1—20 to 27 inches; very gravelly fine sandy loam
2C2—27 to 41 inches; very gravelly sandy loam
2Cg—41 to 60 inches; very gravelly sandy loam

Cryaquolls, Somewhat Poorly Drained, Till Substratum, and Similar Soils

Setting
Landform: Mountains, depressional areas on outwash plains, depressional areas on outwash terraces, and drainageways
Geomorphic position, two-dimensional: Toeslopes
Geomorphic position, three-dimensional: Mountainbases, treads, rises, and talfs
Down-slope shape: Concave
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed alluvium over glacial till and glacial outwash
Slope: 0 to 5 percent
Depth to restrictive feature: 19 to 40 inches to strongly contrasting textural stratification
Drainage class: Somewhat poorly drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: Occasional (See Water Features table.)
Frequency of ponding: Rare (See Water Features table.)
Seasonal high water table, minimum depth: 20 to 30 inches (See Water Features table.)
Available water capacity, entire profile: Low (about 5.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 6w
Plant community classification: Subalpine fir series, wetland (CEW0)

Typical profile
A1—0 to 7 inches; loam
A2—7 to 15 inches; loam
Bg—15 to 19 inches; silt loam
2Cg1—19 to 29 inches; sandy loam
2Cg2—29 to 38 inches; gravelly loamy coarse sand
2Cg3—38 to 60 inches; gravelly fine sandy loam

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

387—Volmont-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 3—Olympic and Cascade Mountains
Elevation: 4,500 to 6,000 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Volmont and similar soils: 65 percent
Rock outcrop: 20 percent
Unnamed dissimilar minor components: 15 percent

Volmont and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Summits, shoulders, and backslopes
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium and residuum from volcanic rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/pinegrass (CEG310)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw—4 to 13 inches; very gravelly ashy sandy loam
2BC—13 to 21 inches; very gravelly sandy loam
2C—21 to 32 inches; very gravelly sandy loam
2R—32 to 36 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

388—Wagberg-Lithic Ultic Haploxerolls-Rock outcrop complex, 35 to 90 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,200 to 3,700 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 110 to 140 days

Map Unit Composition

Wagberg, cool, and similar soils: 50 percent
Lithic Ultic Haploxerolls and similar soils: 20 percent
Rock outcrop: 20 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 5 percent

Wagberg, Cool, and Similar Soils

Setting
Landform: Glacial moraines
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial till from granite and metamorphic rock
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Cool Stony 15+ P.Z. (R006XY203WA)

Typical profile
A—0 to 10 inches; ashy sandy loam
Bw1—10 to 14 inches; gravelly ashy sandy loam
2Bw2—14 to 24 inches; very gravelly sandy loam
2C1—24 to 35 inches; very gravelly sandy loam
2C2—35 to 60 inches; very gravelly loamy sand

Lithic Ultic Haploxerolls and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Colluvium and residuum derived from granitic and metamorphic rocks
Slope: 35 to 90 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A—0 to 10 inches; very stony sandy loam
C—10 to 15 inches; very cobbly sandy loam
R—15 to 25 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 90 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Rubble land
Composition: 5 percent

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

389—Wagberg-Swakane complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,200 to 3,200 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Wagberg and similar soils: 65 percent
Swakane and similar soils: 20 percent
Named dissimilar minor components: 15 percent

Wagberg and Similar Soils

Setting
Landform: Glacial moraines
Aspect, representative: Southwest
Aspect, range: Southeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial till from granite and metamorphic rock
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A—0 to 10 inches; ashy sandy loam
Bw1—10 to 14 inches; gravelly ashy sandy loam
2Bw2—14 to 24 inches; very gravelly sandy loam
2C1—24 to 35 inches; very gravelly sandy loam
2C2—35 to 60 inches; very gravelly loamy sand

Swakane and Similar Soils

Setting
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Nose slopes, side slopes, and head slopes
Aspect, representative: Southwest
Aspect, range: Southeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 12 inches) over colluvium and residuum from granitic and metamorphic rocks
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 4 inches; very stony ashy sandy loam
A2—4 to 11 inches; very gravelly ashy sandy loam
2Bw—11 to 17 inches; very gravelly sandy loam
2R—17 to 21 inches; unweathered bedrock

Named Dissimilar Minor Components

Lithic Ultic Haploxerolls
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Storer soils
Composition: 5 percent
Landform: Foothills
Geomorphic position, two-dimensional: Shoulders and backslopes
Geomorphic position, three-dimensional: Side slopes and head slopes

Wenner soils
Composition: 3 percent
Landform: Glacial terraces
Geomorphic position, three-dimensional: Treads and risers

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

390—Wagberg-Swakane-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,000 to 2,950 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Wagberg and similar soils: 55 percent
Swakane and similar soils: 20 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 15 percent

Wagberg and Similar Soils

Setting
Landform: Glacial moraines
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial till from granite and metamorphic rock
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A—0 to 10 inches; ashy sandy loam
Bw1—10 to 14 inches; gravelly ashy sandy loam
2Bw2—14 to 24 inches; very gravelly sandy loam
2C1—24 to 35 inches; very gravelly sandy loam
2C2—35 to 60 inches; very gravelly loamy sand

Swakane and Similar Soils

Setting
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Nose slopes, side slopes, and head slopes

Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 12 inches) over colluvium and residuum from granitic and metamorphic rocks
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 1.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 4 inches; very stony ashy sandy loam
A2—4 to 11 inches; very gravelly ashy sandy loam
2Bw—11 to 17 inches; very gravelly sandy loam
2R—17 to 21 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Lithic Ultic Haploxerolls
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Storer soils
Composition: 5 percent
Landform: Foothills
Geomorphic position, two-dimensional: Shoulders and backslopes
Geomorphic position, three-dimensional: Side slopes and head slopes

Wenner soils
Composition: 4 percent
Landform: Glacial terraces
Geomorphic position, three-dimensional: Treads and risers

Conconcully soils
Composition: 1 percent
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Side slopes

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

391—Wapal ashy sandy loam, 0 to 20 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 43A—Northern Rocky Mountains
Elevation: 3,100 to 3,900 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Wapal, cool, and similar soils: 80 percent
Named dissimilar minor components: 18 percent
Unnamed dissimilar minor components: 2 percent

Wapal, Cool, and Similar Soils

Setting
Landform: Outwash terraces
Geomorphic position, three-dimensional: Treads and risers
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial outwash
Slope: 0 to 20 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 4s
Plant community classification: Douglas-fir/dwarf huckleberry (CDS831)

Typical profile
A—0 to 4 inches; ashy sandy loam
Bw—4 to 11 inches; very gravelly ashy coarse sandy loam
2C1—11 to 32 inches; extremely cobbly loamy coarse sand
2C2—32 to 60 inches; very gravelly loamy coarse sand

Named Dissimilar Minor Components

Torboy soils
Composition: 7 percent
Landform: Glacial terraces
Geomorphic position, three-dimensional: Treads and risers

Goddard soils
Composition: 6 percent
Landform: Outwash terraces
Geomorphic position, three-dimensional: Risers and treads

Merkel soils
Composition: 5 percent
Landform: Mountains

Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

392—Wapal stony ashy coarse sandy loam, 0 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,200 to 3,400 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Wapal, cool, and similar soils: 85 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Wapal, Cool, and Similar Soils

Setting
Landform: Outwash terraces
Geomorphic position, three-dimensional: Treads
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial outwash
Slope: 0 to 15 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 4s
Plant community classification: Douglas-fir/dwarf huckleberry (CDS831)

Typical profile
A—0 to 4 inches; stony ashy coarse sandy loam
Bw—4 to 11 inches; very gravelly ashy coarse sandy loam
2C1—11 to 32 inches; extremely cobbly loamy coarse sand
2C2—32 to 60 inches; very gravelly loamy coarse sand

Named Dissimilar Minor Components

Torboy soils
Composition: 5 percent
Landform: Glacial terraces
Geomorphic position, three-dimensional: Treads and risers

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

393—Wapal bouldery ashy sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,200 to 4,000 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Wapal, dry, warm, and similar soils: 85 percent
Named dissimilar minor components: 15 percent

Wapal, Dry, Warm, and Similar Soils

Setting
Landform: Outwash terraces
Geomorphic position, three-dimensional: Treads and risers
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial outwash
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 4s
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 4 inches; bouldery ashy sandy loam
Bw—4 to 11 inches; very gravelly ashy coarse sandy loam
2C1—11 to 32 inches; extremely cobbly loamy coarse sand
2C2—32 to 60 inches; very gravelly loamy coarse sand

Named Dissimilar Minor Components

Brevco soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Merkel soils
Composition: 5 percent
Landform: Mountains

Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Pebcreek soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

394—Wapal very stony ashy coarse sandy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,500 to 5,000 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 40 to 46 degrees F
Frost-free period: 95 to 120 days

Map Unit Composition

Wapal, dry, and similar soils: 85 percent
Named dissimilar minor components: 15 percent

Wapal, Dry, and Similar Soils

Setting
Landform: Outwash terraces
Geomorphic position, three-dimensional: Risers
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial outwash
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/bitterbrush/pinegrass (CDS675)

Typical profile
A—0 to 4 inches; very stony ashy coarse sandy loam
Bw—4 to 11 inches; very gravelly ashy coarse sandy loam
2C1—11 to 32 inches; extremely cobbly loamy coarse sand
2C2—32 to 60 inches; very gravelly loamy coarse sand

Named Dissimilar Minor Components

Brevco soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Pebcreek soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Rock outcrop
Composition: 3 percent

Sacheen soils
Composition: 2 percent
Landform: Side slopes in drainageways on outwash terraces
Geomorphic position, three-dimensional: Risers

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

395—Wapal very stony ashy coarse sandy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,600 to 5,600 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 40 to 46 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Wapal and similar soils: 85 percent
Named dissimilar minor components: 15 percent

Wapal and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial outwash
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None

Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 4 inches; very stony ashy coarse sandy loam
Bw—4 to 11 inches; very gravelly ashy coarse sandy loam
2C1—11 to 32 inches; extremely cobbly loamy coarse sand
2C2—32 to 60 inches; very gravelly loamy coarse sand

Named Dissimilar Minor Components

Merkel soils
Composition: 9 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Pebcreek soils
Composition: 6 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

396—Wapal very stony ashy coarse sandy loam, dry, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,500 to 5,600 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 40 to 46 degrees F
Frost-free period: 95 to 120 days

Map Unit Composition

Wapal and similar soils: 85 percent
Named dissimilar minor components: 15 percent

Wapal and Similar Soils

Setting
Landform: Outwash terraces
Geomorphic position, three-dimensional: Risers
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial outwash

Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/bitterbrush/pinegrass (CDS675)

Typical profile
A—0 to 4 inches; very stony ashy coarse sandy loam
Bw—4 to 11 inches; very gravelly ashy coarse sandy loam
2C1—11 to 32 inches; extremely cobbly loamy coarse sand
2C2—32 to 60 inches; very gravelly loamy coarse sand

Named Dissimilar Minor Components

Brevco soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Pebcreek soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Rock outcrop
Composition: 5 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

397—Wapal-Brevco complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,400 to 4,400 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 40 to 46 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Wapal and similar soils: 60 percent
Brevco and similar soils: 25 percent
Named dissimilar minor components: 11 percent
Unnamed dissimilar minor components: 4 percent

Wapal and Similar Soils

Setting

Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities

Parent material: Mixed volcanic ash (7 to 14 inches) over glacial outwash
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile

A—0 to 4 inches; stony ashy coarse sandy loam
Bw—4 to 11 inches; very gravelly ashy coarse sandy loam
2C1—11 to 32 inches; extremely cobbly loamy coarse sand
2C2—32 to 60 inches; very gravelly loamy coarse sand

Brevco and Similar Soils

Setting

Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities

Parent material: Mixed volcanic ash (10 to 14 inches) over colluvium and residuum from granitic rocks
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.3 inches)

Interpretive groups

Land capability classification, nonirrigated: 6e
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile

A—0 to 3 inches; stony ashy coarse sandy loam

Bw—3 to 11 inches; gravelly ashy coarse sandy loam
2C1—11 to 25 inches; very gravelly sandy loam
2C2—25 to 38 inches; very cobbly coarse sandy loam
2R—38 to 48 inches; unweathered bedrock

Named Dissimilar Minor Components

Merkel soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Pebcreek soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Rock outcrop
Composition: 3 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

398—Wapal-Brevco complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,000 to 4,900 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 40 to 46 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Wapal and similar soils: 60 percent
Brevco and similar soils: 25 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Wapal and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial outwash
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Somewhat excessively drained

Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 4 inches; stony ashy coarse sandy loam
Bw—4 to 11 inches; very gravelly ashy coarse sandy loam
2C1—11 to 32 inches; extremely cobbly loamy coarse sand
2C2—32 to 60 inches; very gravelly loamy coarse sand

Brevco and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 14 inches) over colluvium and residuum from granitic rocks
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 3 inches; gravelly ashy coarse sandy loam
Bw—3 to 11 inches; gravelly ashy coarse sandy loam
2C1—11 to 25 inches; very gravelly sandy loam
2C2—25 to 38 inches; very cobbly coarse sandy loam
2R—38 to 48 inches; unweathered bedrock

Named Dissimilar Minor Components

Merkel soils
Composition: 4 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Pebcreek soils
Composition: 4 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

399—Wapal-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,800 to 5,600 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 40 to 46 degrees F
Frost-free period: 95 to 120 days

Map Unit Composition

Wapal, dry, and similar soils: 70 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 15 percent

Wapal, Dry, and Similar Soils

Setting
Landform: Outwash terraces
Geomorphic position, three-dimensional: Risers
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial outwash
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/bitterbrush/pinegrass (CDS675)

Typical profile
A—0 to 4 inches; very stony ashy coarse sandy loam
Bw—4 to 11 inches; very gravelly ashy coarse sandy loam
2C1—11 to 32 inches; extremely cobbly loamy coarse sand
2C2—32 to 60 inches; very gravelly loamy coarse sand

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Brevco soils
Composition: 9 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Doe soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Rubble land
Composition: 3 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

400—Wapal-Sacheen complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 2,900 to 4,100 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Wapal, dry, warm, and similar soils: 50 percent
Sacheen and similar soils: 30 percent
Named dissimilar minor components: 15 percent
Unnamed dissimilar minor components: 5 percent

Wapal, Dry, Warm, and Similar Soils

Setting
Landform: Side slopes in drainageways on outwash terraces
Geomorphic position, three-dimensional: Mountainbases and risers
Aspect, representative: Northeast
Aspect, range: West to southeast (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial outwash
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None

Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 6s
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 4 inches; stony ashy coarse sandy loam
Bw—4 to 11 inches; very gravelly ashy coarse sandy loam
2C1—11 to 32 inches; extremely cobbly loamy coarse sand
2C2—32 to 60 inches; very gravelly loamy coarse sand

Sacheen and Similar Soils

Setting
Landform: Side slopes in drainageways on outwash terraces
Geomorphic position, three-dimensional: Mountainbases and risers
Aspect, representative: Northeast
Aspect, range: West to southeast (clockwise)

Properties and qualities
Parent material: Glacial outwash or glaciofluvial deposits derived from granite
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131) and Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 5 inches; loamy sand
C1—5 to 15 inches; loamy sand
C2—15 to 60 inches; loamy sand

Named Dissimilar Minor Components

Sitdown soils
Composition: 5 percent
Landform: Outwash terraces on mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, risers, and treads

Stepstone soils
Composition: 4 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Martella soils
Composition: 3 percent

Landform: Glacial lake terraces
Geomorphic position, three-dimensional: Treads

Merkel soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Stapaloop soils
Composition: 1 percent
Landform: Terraces on mountains
Geomorphic position, two-dimensional: Toeslopes and footslopes
Geomorphic position, three-dimensional: Mountainbases, the lower third of mountainflanks, treads, and risers

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

401—Water

This map unit consists of streams, rivers, lakes, and reservoirs. The areas are covered with water in most years. Depending on the time of year and the amount of spring runoff, the map unit boundary between water and adjacent map units can fluctuate. The land capability classification is 8.

402—Wellsfar-Dodd-Rock outcrop complex, 15 to 35

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,900 to 6,200 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Wellsfar and similar soils: 50 percent
Dodd and similar soils: 25 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Wellsfar and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) mixed with colluvium and residuum derived from granite

Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 6s
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
A—0 to 3 inches; gravelly ashy sandy loam
Bw1—3 to 8 inches; gravelly ashy sandy loam
2Bw2—8 to 16 inches; very gravelly coarse sandy loam
2C—16 to 25 inches; very gravelly coarse sandy loam
2Cr—25 to 35 inches; weathered bedrock

Dodd and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 11 inches) over colluvium and residuum from granitic and metamorphic rocks
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 0.7 inch)

Interpretive groups
Land capability classification, nonirrigated: 6s
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
A—0 to 4 inches; very gravelly ashy sandy loam
Bw—4 to 8 inches; very gravelly ashy coarse sandy loam
2C—8 to 16 inches; extremely gravelly loamy coarse sand
2R—16 to 20 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Sitdown soils
Composition: 5 percent
Landform: Outwash terraces on mountains

Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, risers, and treads

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

403—Wellsfar-Sitdown complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,900 to 6,200 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Wellsfar and similar soils: 60 percent
Sitdown, cool, and similar soils: 25 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Wellsfar and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium and residuum derived from granite
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 6s
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
A—0 to 3 inches; gravelly ashy sandy loam
Bw1—3 to 8 inches; gravelly ashy sandy loam
2Bw2—8 to 16 inches; very gravelly coarse sandy loam
2C—16 to 25 inches; very gravelly coarse sandy loam
2Cr—25 to 35 inches; weathered bedrock

Sitdown, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (10 to 14 inches) over glacial outwash and glacial till
Slope: 15 to 35 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
A—0 to 3 inches; stony ashy sandy loam
Bw—3 to 11 inches; gravelly ashy sandy loam
2C1—11 to 23 inches; extremely cobbly loamy sand
2C2—23 to 60 inches; extremely gravelly loamy sand

Named Dissimilar Minor Components

Myerscreek soils
Composition: 3 percent
Landform: Glacial moraines on mountains
Geomorphic position, two-dimensional: Backslopes, footslopes, and toeslopes
Geomorphic position, three-dimensional: Mountainflanks

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

404—Wellsfar-Sitdown complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 5,200 to 6,200 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Wellsfar and similar soils: 60 percent
Sitdown, cool, and similar soils: 25 percent

Named dissimilar minor components: 2 percent
Unnamed dissimilar minor components: 13 percent

Wellsfar and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: West
Aspect, range: South to north (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) mixed with colluvium and residuum derived from granite
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
A—0 to 3 inches; gravelly ashy sandy loam
Bw1—3 to 8 inches; gravelly ashy sandy loam
2Bw2—8 to 16 inches; very gravelly coarse sandy loam
2C—16 to 25 inches; very gravelly coarse sandy loam
2Cr—25 to 35 inches; weathered bedrock

Sitdown, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: West
Aspect, range: South to north (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 14 inches) over glacial outwash and glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 10 to 20 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
A—0 to 3 inches; stony ashy sandy loam
Bw—3 to 11 inches; gravelly ashy sandy loam
2C1—11 to 23 inches; extremely cobbly loamy sand
2C2—23 to 60 inches; extremely gravelly loamy sand

Named Dissimilar Minor Components

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

405—Wenner ashy loam, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,400 to 3,300 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Wenner and similar soils: 85 percent
Named dissimilar minor components: 15 percent

Wenner and Similar Soils

Setting
Landform: Glacial terraces
Geomorphic position, three-dimensional: Risers
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 18 inches) over glacial till from metavolcanics and metamorphic rock
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: High (about 9.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 5 inches; ashy loam
A2—5 to 12 inches; gravelly ashy sandy loam
AB—12 to 18 inches; gravelly ashy sandy loam
2Bt1—18 to 25 inches; gravelly clay loam

2Bt2—25 to 33 inches; gravelly clay loam
2Bt3—33 to 60 inches; gravelly clay loam

Named Dissimilar Minor Components

Storer soils
Composition: 5 percent
Landform: Foothills
Geomorphic position, two-dimensional: Shoulders and backslopes
Geomorphic position, three-dimensional: Side slopes and head slopes

Swakane soils
Composition: 5 percent
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Nose slopes, side slopes, and head slopes

Wagberg soils
Composition: 5 percent
Landform: Glacial moraines

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

406—Wenner ashy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,600 to 3,500 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 130 days

Map Unit Composition

Wenner and similar soils: 85 percent
Named dissimilar minor components: 15 percent

Wenner and Similar Soils

Setting
Landform: Glacial terraces
Geomorphic position, three-dimensional: Risers
Aspect, representative: East
Aspect, range: North to south (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 18 inches) over glacial till from metavolcanics and metamorphic rock
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: High (about 9.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Ecological site: Stony 15+ P.Z. (R006XY202WA)

Typical profile
A1—0 to 5 inches; ashy loam
A2—5 to 12 inches; gravelly ashy sandy loam
AB—12 to 18 inches; gravelly ashy sandy loam
2Bt1—18 to 25 inches; gravelly clay loam
2Bt2—25 to 33 inches; gravelly clay loam
2Bt3—33 to 60 inches; gravelly clay loam

Named Dissimilar Minor Components

Storer soils
Composition: 5 percent
Landform: Foothills
Geomorphic position, two-dimensional: Shoulders and backslopes
Geomorphic position, three-dimensional: Side slopes and head slopes

Wagberg soils
Composition: 5 percent
Landform: Glacial moraines

Swakane soils
Composition: 3 percent
Landform: Foothills
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Nose slopes, side slopes, and head slopes

Lithic Ultic Haploxerolls
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

407—Wilder-Republic complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,500 to 3,470 feet
Mean annual precipitation: 17 to 20 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 130 days

Map Unit Composition

Wilder and similar soils: 55 percent
Republic and similar soils: 30 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Wilder and Similar Soils

Setting
Landform: Terraces on mountains

Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks and risers
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (14 to 20 inches) over glaciofluvial deposits
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/bluebunch wheatgrass (CDG322)

Typical profile
A1—0 to 6 inches; ashy sandy loam
A2—6 to 10 inches; ashy sandy loam
Bw—10 to 15 inches; ashy sandy loam
2BC—15 to 21 inches; loamy sand
2C1—21 to 39 inches; gravelly loamy sand
2C2—39 to 60 inches; sand

Republic and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 15 inches) over alluvium and glacial till
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass–bluebunch wheatgrass (CDG134)

Typical profile
A1—0 to 6 inches; ashy loam
A2—6 to 15 inches; ashy sandy loam
2Bw1—15 to 28 inches; sandy loam
2Bw2—28 to 35 inches; gravelly sandy loam
2C—35 to 60 inches; very gravelly sandy loam

Named Dissimilar Minor Components

Donovan soils
Composition: 5 percent

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

408—Wilma-Lithic Haploxerepts-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 4,000 to 4,600 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Wilma and similar soils: 45 percent
Lithic Haploxerepts, forested, moist, and similar soils: 25 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 11 percent
Unnamed dissimilar minor components: 4 percent

Wilma and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: Northeast
Aspect, range: West to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 14 inches) over colluvium and residuum from metavolcanics and granite
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 6 inches; gravelly ashy fine sandy loam
Bw—6 to 12 inches; gravelly ashy fine sandy loam
2BC—12 to 17 inches; very cobbly fine sandy loam

2C—17 to 28 inches; extremely gravelly coarse sandy loam
2R—28 to 32 inches; unweathered bedrock

Lithic Haploxerepts, Forested, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Northeast
Aspect, range: West to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over bedrock
Slope: 15 to 35 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Plant community classification: Douglas-fir/pinegrass (CDG131) and Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 3 inches; cobbly ashy sandy loam
Bw—3 to 12 inches; cobbly ashy sandy loam
2C—12 to 18 inches; very gravelly sandy loam
2R—18 to 22 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Merkel soils
Composition: 8 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks

Nevine soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

409—Wilma-Lithic Haploxerepts-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,900 to 4,000 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Wilma, moist, and similar soils: 55 percent
Lithic Haploxerepts, forested, moist, and similar soils: 25 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 10 percent

Wilma, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: Northwest
Aspect, range: Southwest to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 14 inches) over colluvium and residuum from metavolcanics and granite
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/kinnikinnick (bearberry)/pinegrass (CDS655)

Typical profile
A—0 to 6 inches; stony ashy fine sandy loam
Bw—6 to 12 inches; gravelly ashy fine sandy loam
2BC—12 to 17 inches; very cobbly fine sandy loam
2C—17 to 28 inches; extremely gravelly coarse sandy loam
2R—28 to 32 inches; unweathered bedrock

Lithic Haploxerepts, Forested, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Northwest
Aspect, range: Southwest to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over bedrock
Slope: 35 to 65 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A—0 to 3 inches; cobbly ashy sandy loam
Bw—3 to 12 inches; cobbly ashy sandy loam
2C—12 to 18 inches; very gravelly sandy loam
2R—18 to 22 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Brevco soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Pettijohn soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

410—Wilma-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,900 to 4,560 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Wilma, cool, and similar soils: 60 percent
Rock outcrop: 20 percent

Named dissimilar minor components: 15 percent
Unnamed dissimilar minor components: 5 percent

Wilma, Cool, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: North
Aspect, range: West to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (10 to 14 inches) over colluvium and residuum from metavolcanics and granite
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/low huckleberry (CDS832)

Typical profile
A—0 to 6 inches; stony ashy fine sandy loam
Bw—6 to 12 inches; gravelly ashy fine sandy loam
2BC—12 to 17 inches; very cobbly fine sandy loam
2C—17 to 28 inches; extremely gravelly coarse sandy loam
2R—28 to 32 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Nevine soils
Composition: 9 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Brevco soils
Composition: 6 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

411—Winsand-Verhart complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 4,800 to 5,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Winsand and similar soils: 60 percent
Verhart and similar soils: 20 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 10 percent

Winsand and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium from sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/pinegrass (CEG310)

Typical profile
A—0 to 5 inches; gravelly ashy sandy loam
Bw—5 to 12 inches; gravelly ashy sandy loam
2C1—12 to 24 inches; very cobbly sandy loam
2C2—24 to 43 inches; very cobbly sandy loam
2R—43 to 47 inches; unweathered bedrock

Verhart and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium and residuum from sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/pinegrass (CEG310)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw—4 to 11 inches; very gravelly ashy sandy loam
2C—11 to 24 inches; very gravelly sandy loam
2R—24 to 28 inches; unweathered bedrock

Named Dissimilar Minor Components

Longort soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Shermount soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Mountaintops

Nicmar soils
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

412—Winthrop stony loamy sand, 0 to 45 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 1,300 to 2,700 feet
Mean annual precipitation: 11 to 16 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 135 days

Map Unit Composition

Winthrop and similar soils: 100 percent

Winthrop and Similar Soils

Setting
Landform: Outwash terraces
Geomorphic position, three-dimensional: Treads and risers
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Alluvium and glacial outwash
Slope: 0 to 45 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): Very high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Ponderosa pine/bluebunch wheatgrass (CPG141)

Typical profile
A1—0 to 5 inches; stony loamy sand
A2—5 to 13 inches; gravelly loamy sand
C1—13 to 25 inches; gravelly loamy sand
C2—25 to 60 inches; very gravelly sand

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

413—Wocreek-Coopmont complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 4,000 to 6,000 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Wocreek and similar soils: 50 percent
Coopmont and similar soils: 35 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Wocreek and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks

Aspect, representative: Northeast
Aspect, range: West to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (40 to 60 inches) over glacial till
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry)/pinegrass (CES413)

Typical profile
A—0 to 7 inches; ashy sandy loam
Bw—7 to 34 inches; paragravelly ashy sandy loam
BC—34 to 51 inches; very gravelly ashy loamy coarse sand
2C—51 to 60 inches; gravelly sandy loam

Coopmont and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: Northeast
Aspect, range: West to southeast (clockwise)

Properties and qualities
Parent material: Volcanic ash and pumice (25 to 38 inches) over colluvium and residuum from granodiorite
Slope: 15 to 35 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Subalpine fir/grouse blueberry (huckleberry) (CES426)

Typical profile
A—0 to 3 inches; paragravelly ashy fine sandy loam
C—3 to 4 inches; ashy fine sandy loam
Bw1—4 to 10 inches; paragravelly ashy coarse sandy loam
Bw2—10 to 23 inches; paragravelly ashy coarse sandy loam
Bw3—23 to 29 inches; paragravelly ashy coarse sandy loam
2Bw4—29 to 37 inches; extremely stony coarse sandy loam
2C—37 to 60 inches; extremely gravelly sandy loam

Named Dissimilar Minor Components

Fears soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Upper third of mountainflanks

Remmel soils
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

414—Wynhoff gravelly sandy loam, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,500 to 4,700 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 110 to 140 days

Map Unit Composition

Wynhoff and similar soils: 85 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Wynhoff and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: Southwest
Aspect, range: Southeast to west (clockwise)

Properties and qualities
Parent material: Colluvium and residuum from granite or metasedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Cool Stony 15+ P.Z. (R006XY203WA)

Typical profile
A1—0 to 5 inches; gravelly sandy loam
A2—5 to 9 inches; gravelly sandy loam
Bw—9 to 18 inches; very gravelly sandy loam
C—18 to 24 inches; extremely gravelly sandy loam
R—24 to 34 inches; unweathered bedrock

Named Dissimilar Minor Components

Rock outcrop
Composition: 5 percent

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

415—Wynhoff-Lithic Haploxerepts-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 43A—Northern Rocky Mountains
Elevation: 2,800 to 3,500 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 110 to 140 days

Map Unit Composition

Wynhoff and similar soils: 50 percent
Lithic Haploxerepts, range, moist, and similar soils: 20 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 9 percent
Unnamed dissimilar minor components: 6 percent

Wynhoff and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Colluvium and residuum from granite or metasedimentary rock
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Ecological site: Cool Stony 15+ P.Z. (R006XY203WA)

Typical profile
A1—0 to 5 inches; gravelly sandy loam
A2—5 to 9 inches; gravelly sandy loam
Bw—9 to 18 inches; very gravelly sandy loam
C—18 to 24 inches; extremely gravelly sandy loam
R—24 to 34 inches; unweathered bedrock

Lithic Haploxerepts, Range, Moist, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over bedrock
Slope: 15 to 35 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Ecological site: Dry Stony 15+ P.Z. (R006XY201WA)

Typical profile
A—0 to 3 inches; cobbly ashy sandy loam
Bw—3 to 12 inches; cobbly ashy sandy loam
2C—12 to 18 inches; very gravelly sandy loam
2R—18 to 22 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Wagberg soils
Composition: 9 percent
Landform: Glacial moraines

Use and Management

Major uses: Livestock grazing, recreation, watershed, and wildlife habitat

416—Yellcreek-Midpeak-Rock outcrop complex, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,300 to 4,700 feet
Mean annual precipitation: 20 to 24 inches

Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Yellcreek and similar soils: 55 percent
Midpeak and similar soils: 25 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 8 percent
Unnamed dissimilar minor components: 2 percent

Yellcreek and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: North
Aspect, range: Southwest to southeast (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 25 inches) over colluvium and glacial till from volcanic and sedimentary rock
Slope: 35 to 65 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pachistima/pinegrass (CDS412)

Typical profile
A1—0 to 5 inches; gravelly ashy sandy loam
A2—5 to 12 inches; very gravelly ashy sandy loam
Bw—12 to 25 inches; very gravelly ashy sandy loam
2C1—25 to 35 inches; extremely gravelly sandy loam
2C2—35 to 60 inches; extremely gravelly sandy loam

Midpeak and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: Southwest to southeast (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 15 inches) over colluvium and residuum from volcanic rock and sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None

Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass (CDG131)

Typical profile
A1—0 to 6 inches; gravelly ashy sandy loam
A2—6 to 15 inches; very gravelly ashy sandy loam
2Bw—15 to 23 inches; very gravelly sandy loam
2C—23 to 36 inches; extremely gravelly sandy loam
2R—36 to 40 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Chutes
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Johntom soils
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Livestock grazing, timber production, recreation, watershed, and wildlife habitat

700—Andic Eutrocryepts-Lithic Vitricryands complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 4,400 to 5,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Andic Eutrocryepts, nonforested, xeric, and similar soils: 60 percent
Lithic Vitricryands, nonforested, xeric, and similar soils: 40 percent

Andic Eutrocryepts, Nonforested, Xeric, and Similar Soils

Setting
Landform: Glacial-trough valleys on mountains

Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Parkland Zone, undifferentiated subseries, Eastern Washington (CAC0)

Typical profile
A—0 to 11 inches; very gravelly ashy sandy loam
Bw—11 to 14 inches; gravelly ashy sandy loam
2BC—14 to 25 inches; very gravelly coarse sandy loam
2C1—25 to 34 inches; very gravelly loamy coarse sand
2C2—34 to 60 inches; very gravelly loamy coarse sand

Lithic Vitricryands, Nonforested, Xeric, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over colluvium and residuum
Slope: 15 to 35 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Land capability classification, irrigated: 6e
Plant community classification: Parkland Zone, undifferentiated subseries, Eastern Washington (CAC0)

Typical profile
A—0 to 4 inches; stony ashy silt loam
Bw1—4 to 10 inches; very stony ashy sandy loam

Bw2—10 to 18 inches; very stony ashy sandy loam
2R—18 to 22 inches; unweathered bedrock

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

701—Andic Eutrocryepts-Xeric Vitricryands-Rock outcrop complex, 20 to 50 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 3—Olympic and Cascade Mountains
Elevation: 3,900 to 5,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Andic Eutrocryepts, xeric, forested, and similar soils: 50 percent
Xeric Vitricryands, forested, and similar soils: 25 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 10 percent

Andic Eutrocryepts, Xeric, Forested, and Similar Soils

Setting
Landform: Glacial-trough valleys on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Aspect, representative: Northwest
Aspect, range: South to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 20 to 50 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir–Engelmann spruce closed forest series, Eastern Washington (CE)

Typical profile
A—0 to 5 inches; ashy silt loam
Bw—5 to 14 inches; ashy silt loam
2C1—14 to 26 inches; cobbly fine sandy loam
2C2—26 to 60 inches; gravelly loamy sand

Xeric Vitricryands, Forested, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Northwest
Aspect, range: South to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 50 inches) over colluvium, residuum, and glacial till from granite and sedimentary rock
Slope: 35 to 50 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry–twinflower group, Eastern Washington (PCES3F2)

Typical profile
A—0 to 5 inches; gravelly ashy sandy loam
Bw1—5 to 10 inches; gravelly ashy sandy loam
Bw2—10 to 17 inches; gravelly ashy sandy loam
2BC—17 to 25 inches; very gravelly sandy loam
2C—25 to 60 inches; very gravelly sandy loam

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 20 to 50 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Lithic Eutrocryepts
Composition: 10 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

702—Andic Haplocryods-Typic Vitricryands complex, cirque basin, 10 to 50 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 4,000 to 8,000 feet
Mean annual precipitation: 40 to 90 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Andic Haplocryods, cirque basin, and similar soils: 60 percent
Typic Vitricryands, cirque basin, forested, and similar soils: 40 percent

Andic Haplocryods, Cirque Basin, and Similar Soils

Setting

Landform: Glacial-trough valleys on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities

Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 10 to 50 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.1 inches)

Interpretive groups

Land capability classification, nonirrigated: 7e
Plant community classification: Parkland Zone, subalpine larch subseries, Eastern Washington (CAC1)

Typical profile

E—0 to 2 inches; ashy fine sandy loam
Bs1—2 to 10 inches; ashy sandy loam
Bs2—10 to 13 inches; gravelly ashy sandy loam
2BC—13 to 22 inches; very gravelly sandy loam
2C—22 to 34 inches; extremely cobbly sandy loam
2R—34 to 38 inches; unweathered bedrock

Typic Vitricryands, Cirque Basin, Forested, and Similar Soils

Setting

Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Down-slope shape: Concave
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities

Parent material: Volcanic ash (14 to 50 inches) over colluvium, residuum, and glacial till
Slope: 10 to 50 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None

Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 8.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Parkland Zone, undifferentiated subseries, Eastern Washington (CAC0)

Typical profile
A—0 to 5 inches; ashy very fine sandy loam
Bw1—5 to 11 inches; gravelly ashy sandy loam
Bw2—11 to 21 inches; gravelly silt loam
2Bw3—21 to 31 inches; very gravelly silt loam
2Bw4—31 to 60 inches; gravelly silt loam

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

703—Cryaquepts-Aquic Dystrocryepts complex, 0 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 5,000 to 6,800 feet
Mean annual precipitation: 50 to 70 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days

Map Unit Composition

Cryaquepts, glaciofluvial, aquic, forested, and similar soils: 55 percent
Aquic Dystrocryepts, till substratum, udic, forested, and similar soils: 45 percent

Cryaquepts, Glaciofluvial, Aquic, Forested, and Similar Soils

Setting
Landform: Flood plains on mountains
Geomorphic position, two-dimensional: Toeslopes
Geomorphic position, three-dimensional: Mountainbases
Down-slope shape: Linear
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 12 inches) over glaciofluvial deposits
Slope: 0 to 10 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Poorly drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: Occasional (See Water Features table.)
Frequency of ponding: Occasional (See Water Features table.)
Seasonal high water table, minimum depth: About 0 to 18 inches (See Water Features table.)
Available water capacity, entire profile: High (about 10.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 6w
Plant community classification: Engelmann spruce series, wetland (CEM0)

Typical profile
Oi—0 to 1 inch; peat
Oe—1 to 3 inches; mucky peat
Oa—3 to 4 inches; muck
A—4 to 12 inches; ashy silt loam
2Bw1—12 to 20 inches; silt loam
2Bw2—20 to 26 inches; fine sandy loam
2Bw3—26 to 60 inches; fine sandy loam

Aquic Dystrocryepts, Till Substratum, Udic, Forested, and Similar Soils

Setting
Landform: Depressions in glacial-trough valleys on mountains; bottoms of drainageways
Geomorphic position, two-dimensional: Footslopes and toeslopes
Geomorphic position, three-dimensional: Mountainbases, talfs, rises, and dips
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Mixed volcanic ash (7 to 11 inches) over glacial till and alluvium
Slope: 10 to 25 percent
Depth to restrictive feature: 20 to 60 inches to dense material
Drainage class: Somewhat poorly drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: About 18 to 34 inches (See Water Features table.)
Available water capacity, entire profile: Low (about 5.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 6w
Plant community classification: Subalpine fir series, wetland (CEW0)

Typical profile
A—0 to 6 inches; ashy fine sandy loam
AB—6 to 11 inches; ashy sandy loam
2Bw1—11 to 28 inches; gravelly sandy loam
2Bw2—28 to 34 inches; very gravelly sandy loam
2Cd—34 to 60 inches; very gravelly sandy loam

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

704—Humic Dystrocryepts-Humic Vitricryands complex, 35 to 75 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 5,600 to 7,200 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Humic Dystrocryepts, nonforested, and similar soils: 55 percent
Humic Vitricryands, nonforested, and similar soils: 45 percent

Humic Dystrocryepts, Nonforested, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (3 to 7 inches) over colluvium from meatamorphic rock
Slope: 35 to 75 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Alpine Zone series, Eastern Washington (CA)

Typical profile
A1—0 to 7 inches; ashy silt loam
A2—7 to 12 inches; silt loam
A3—12 to 24 inches; gravelly silt loam
2Bw—24 to 30 inches; very gravelly coarse sandy loam
2R—30 to 34 inches; unweathered bedrock

Humic Vitricryands, Nonforested, and Similar Soils

Setting
Landform: Glacial-valley walls on mountains
Geomorphic position, two-dimensional: Shoulders, backslopes, footslopes, and toeslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 25 inches) over colluvium from granite
Slope: 35 to 75 percent
Depth to restrictive feature: 20 to 50 inches to paralithic bedrock; 25 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Alpine Zone series, Eastern Washington (CA)

Typical profile
A1—0 to 4 inches; ashy silt loam
A2—4 to 15 inches; ashy silt loam
2Bw1—15 to 24 inches; gravelly fine sandy loam
2Bw2—24 to 30 inches; very gravelly sandy loam
3Cr—30 to 39 inches; weathered bedrock
3R—39 to 43 inches; unweathered bedrock

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

705—Humic Vitricryands-Humic Dystrocryepts complex, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 5,600 to 7,200 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Humic Vitricryands, nonforested, and similar soils: 55 percent
Humic Dystrocryepts, nonforested, and similar soils: 45 percent

Humic Vitricryands, Nonforested, and Similar Soils

Setting
Landform: Mountains; glacial-valley walls
Geomorphic position, two-dimensional: Shoulders and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 25 inches) over colluvium from granite
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 50 inches to paralithic bedrock; 25 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Alpine Zone series, Eastern Washington (CA)

Typical profile
A1—0 to 4 inches; ashy silt loam
A2—4 to 15 inches; ashy silt loam
2Bw1—15 to 24 inches; gravelly fine sandy loam
2Bw2—24 to 30 inches; very gravelly sandy loam

3Cr—30 to 39 inches; weathered bedrock
3R—39 to 43 inches; unweathered bedrock

Humic Dystrocryepts, Nonforested, and Similar Soils

Setting
Landform: Glacial-valley walls on mountains
Geomorphic position, two-dimensional: Shoulders and backslopes
Geomorphic position, three-dimensional: Upper and center thirds of mountainflanks; mountainflanks
Aspect, representative: Southeast
Aspect, range: North to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (3 to 7 inches) over colluvium from meatamorphic rock
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.3 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Alpine Zone series, Eastern Washington (CA)

Typical profile
A1—0 to 7 inches; ashy silt loam
A2—7 to 12 inches; silt loam
A3—12 to 24 inches; gravelly silt loam
2Bw—24 to 30 inches; very gravelly coarse sandy loam
2R—30 to 34 inches; unweathered bedrock

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

706—Lithic Dystrocryepts-Rock outcrop-Chutes, avalanche, complex, 35 to 100 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 5,200 to 7,790 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Lithic Dystrocryepts, nonforested, udic, and similar soils: 40 percent
Rock outcrop: 30 percent
Chutes: 30 percent

Lithic Dystrocryepts, Nonforested, Udic, and Similar Soils

Setting
Landform: Mountains

Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Volcanic ash or mixed volcanic ash (4 to 12 inches) over colluvium and residuum
Slope: 35 to 100 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 8
Plant community classification: Alpine Zone series, Eastern Washington (CA)

Typical profile
A—0 to 4 inches; very stony ashy fine sandy loam
Bw—4 to 10 inches; very stony ashy fine sandy loam
2C—10 to 19 inches; extremely stony sandy loam
2R—19 to 29 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 100 percent. The land capability classification is 8.

Chutes, Avalanche

Chutes, avalanche, consist of areas with a central channel-like corridor, scar, or depression along which an avalanche has moved. They may take the form of an open path in a forest, with bent and broken trees, or an eroded surface marked by pits, scratches, and grooves. The land capability classification is 8.

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

707—Lithic Eutrocryepts-Andic Eutrocryepts complex, 10 to 70 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope, and 3—Olympic and Cascade Mountains
Elevation: 4,400 to 6,160 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Lithic Eutrocryepts, nonforested, xeric, and similar soils: 50 percent
Andic Eutrocryepts, nonforested, xeric, and similar soils: 30 percent
Unnamed dissimilar minor components: 20 percent

Lithic Eutrocryepts, Nonforested, Xeric, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash or mixed volcanic ash (4 to 12 inches) over colluvium and residuum
Slope: 10 to 70 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 8
Plant community classification: Parkland Zone, undifferentiated subseries, Eastern Washington (CAC0)

Typical profile
A—0 to 4 inches; ashy fine sandy loam
2Bw—4 to 16 inches; very stony sandy loam
2R—16 to 20 inches; unweathered bedrock

Andic Eutrocryepts, Nonforested, Xeric, and Similar Soils

Setting
Landform: Mountains and glacial-trough valleys
Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 10 to 70 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Parkland Zone, undifferentiated subseries, Eastern Washington (CAC0)

Typical profile
A—0 to 11 inches; very gravelly ashy sandy loam
Bw—11 to 14 inches; gravelly ashy sandy loam
2BC—14 to 25 inches; very gravelly coarse sandy loam
2C1—25 to 34 inches; very gravelly loamy coarse sand
2C2—34 to 60 inches; very gravelly loamy coarse sand

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

708—Typic Udivitrands-Andic Dystrudepts complex, till substratum, 35 to 75 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 3,000 to 5,000 feet
Mean annual precipitation: 50 to 70 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 85 to 120 days

Map Unit Composition

Typic Udivitrands, till substratum, forested, and similar soils: 55 percent
Andic Dystrudepts, till substratum, and similar soils: 45 percent

Typic Udivitrands, Till Substratum, Forested, and Similar Soils

Setting
Landform: Mountains; glacial-trough valleys
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Aspect, representative: Southwest
Aspect, range: Southeast to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 25 inches) over colluvium, residuum, and glacial till
Slope: 35 to 75 percent
Depth to restrictive feature: 20 to 81 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Western hemlock series, Eastern Washington (CH)

Typical profile
C—0 to 1 inch; ashy sandy loam
2A—1 to 7 inches; gravelly ashy sandy loam
2Bw—7 to 21 inches; gravelly ashy sandy loam
3C1—21 to 36 inches; very gravelly sandy loam
3C2—36 to 60 inches; very gravelly sandy loam

Andic Dystrudepts, Till Substratum, and Similar Soils

Setting
Landform: Glacial-trough mountain valleys
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks
Aspect, representative: Southwest
Aspect, range: Southeast to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 35 to 75 percent
Depth to restrictive feature: 20 to 81 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Western hemlock/vine maple–Cascade Oregon grape–pachistima group, Eastern Washington (PCHS2S1)

Typical profile
A—0 to 5 inches; gravelly ashy sandy loam
Bw—5 to 12 inches; gravelly ashy sandy loam
2BC—12 to 22 inches; very gravelly ashy sandy loam
2Cd—22 to 60 inches; extremely gravelly sandy loam

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

709—Typic Vitricryands-Andic Dystrocryepts-Rock outcrop complex, 20 to 50 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 4,000 to 6,400 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Typic Vitricryands, forested, and similar soils: 40 percent
Andic Dystrocryepts, udic, forested, and similar soils: 35 percent
Rock outcrop: 25 percent

Typic Vitricryands, Forested, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Down-slope shape: Concave
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (14 to 50 inches) over colluvium, residuum, and glacial till
Slope: 20 to 50 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 8.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Parkland Zone, undifferentiated subseries, Eastern Washington (CAC0)

Typical profile
A—0 to 5 inches; ashy very fine sandy loam
Bw1—5 to 11 inches; ashy sandy loam
Bw2—11 to 21 inches; gravelly ashy silt loam
2Bw3—21 to 31 inches; very gravelly silt loam
2Bw4—31 to 60 inches; gravelly silt loam

Andic Dystrocryepts, Udic, Forested, and Similar Soils

Setting
Landform: Glacial-trough mountain valleys
Geomorphic position, two-dimensional: Footslopes and backslopes
Geomorphic position, three-dimensional: Mountainbases and the lower and center thirds of mountainflanks
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 20 to 50 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry–twinflower group, Eastern Washington (PCES3F2)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; ashy fine sandy loam
2Bw—4 to 10 inches; ashy fine sandy loam
3C1—10 to 21 inches; cobbly sandy loam
3C2—21 to 60 inches; gravelly loamy sand

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 20 to 50 percent. The land capability classification is 8.

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

710—Typic Vitricryands-Andic Haplocryods complex, till substratum, 25 to 75 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 4,000 to 5,800 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Typic Vitricryands, till substratum, forested, and similar soils: 60 percent
Andic Haplocryods, till substratum, and similar soils: 40 percent

Typic Vitricryands, Till Substratum, Forested, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Down-slope shape: Concave
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (14 to 50 inches) over colluvium, residuum, and glacial till
Slope: 25 to 75 percent
Depth to restrictive feature: 20 to 81 inches to dense material
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 8.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Pacific silver fir series, Eastern Washington (CF)

Typical profile
A—0 to 5 inches; ashy silt loam
Bw1—5 to 15 inches; gravelly ashy fine sandy loam
Bw2—15 to 21 inches; gravelly ashy fine sandy loam
2BC—21 to 29 inches; very gravelly sandy loam
2Cd—29 to 60 inches; extremely gravelly loamy coarse sand

Andic Haplocryods, Till Substratum, and Similar Soils

Setting
Landform: Glacial-trough valleys on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 25 to 75 percent
Depth to restrictive feature: 20 to 81 inches to dense material
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Parkland Zone, subalpine larch subseries, Eastern Washington (CAC1)

Typical profile
E—0 to 2 inches; ashy fine sandy loam
Bs1—2 to 10 inches; ashy sandy loam
Bs2—10 to 13 inches; gravelly ashy sandy loam
2BC—13 to 22 inches; very gravelly sandy loam
2C—22 to 34 inches; extremely cobbly sandy loam
2Cd—34 to 60 inches; extremely cobbly sandy loam

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

711—Typic Vitrixerands-Andic Haploxerepts complex, till substratum, 15 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,900 to 5,000 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 85 to 120 days

Map Unit Composition

Typic Vitrixerands, till substratum, forested, and similar soils: 65 percent
Andic Haploxerepts, till substratum, forested, and similar soils: 35 percent

Typic Vitrixerands, Till Substratum, Forested, and Similar Soils

Setting
Landform: Mountains

Geomorphic position, two-dimensional: Shoulders and backslopes
Geomorphic position, three-dimensional: Mountaintops and mountainflanks
Aspect, representative: Southwest
Aspect, range: South to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 50 inches) over colluvium, residuum, and glacial till
Slope: 15 to 65 percent
Depth to restrictive feature: 20 to 81 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir series, Eastern Washington (CD)

Typical profile
C—0 to 1 inch; ashy sandy loam
A—1 to 5 inches; gravelly ashy sandy loam
Bw1—5 to 10 inches; gravelly ashy sandy loam
Bw2—10 to 22 inches; very gravelly ashy sandy loam
2CB—22 to 32 inches; very gravelly sandy loam
2Cd—32 to 60 inches; extremely cobbly sandy loam

Andic Haploxerepts, Till Substratum, Forested, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: Southwest
Aspect, range: South to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, or residuum
Slope: 15 to 65 percent
Depth to restrictive feature: 20 to 81 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 8.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir series, Eastern Washington (CD)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw1—4 to 13 inches; gravelly ashy sandy loam
2Bw2—13 to 28 inches; very gravelly ashy sandy loam
2C1—28 to 36 inches; very gravelly sandy loam
2C2—36 to 60 inches; very gravelly sandy loam

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

712—Vitrandic Dystrocryepts-Lithic Dystrocryepts complex, 35 to 70 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 4,900 to 7,200 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Vitrandic Dystrocryepts, nonforested, udic, and similar soils: 50 percent
Lithic Dystrocryepts, nonforested, udic, and similar soils: 50 percent

Vitrandic Dystrocryepts, Nonforested, Udic, and Similar Soils

Setting
Landform: Avalanche chutes; mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks, mountainbases, and mountaintops
Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 25 inches) over colluvium and residuum from mixed rock sources
Slope: 35 to 70 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Alpine Zone series, Eastern Washington (CA)

Typical profile
A1—0 to 4 inches; gravelly ashy sandy loam
A2—4 to 12 inches; gravelly ashy sandy loam
Bw—12 to 20 inches; very gravelly ashy sandy loam
2C—20 to 31 inches; extremely gravelly sandy loam
2R—31 to 35 inches; unweathered bedrock

Lithic Dystrocryepts, Nonforested, Udic, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Aspect, representative: South
Aspect, range: Northeast to west (clockwise)

Properties and qualities
Parent material: Volcanic ash or mixed volcanic ash (4 to 12 inches) over colluvium and residuum
Slope: 35 to 70 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.0 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Alpine Zone series, Eastern Washington (CA)

Typical profile
A—0 to 4 inches; very stony ashy fine sandy loam
Bw—4 to 10 inches; very stony ashy fine sandy loam
2C—10 to 19 inches; extremely stony sandy loam
2R—19 to 29 inches; unweathered bedrock

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

713—Vitrandic Haploxerepts-Typic Vitrixerands-Rock outcrop complex, 30 to 60 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,900 to 5,000 feet
Mean annual precipitation: 20 to 25 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Vitrandic Haploxerepts and similar soils: 50 percent
Typic Vitrixerands, forested, and similar soils: 30 percent
Rock outcrop: 20 percent

Vitrandic Haploxerepts and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 22 inches) over colluvium and residuum from volcanic and sedimentary rock
Slope: 35 to 60 percent

Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir series, Eastern Washington (CD)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw1—4 to 9 inches; gravelly ashy sandy loam
Bw2—9 to 15 inches; very gravelly ashy sandy loam
BC—15 to 22 inches; gravelly ashy sandy loam
2C1—22 to 35 inches; very gravelly sandy loam
2C2—35 to 45 inches; very gravelly sandy loam
2R—45 to 49 inches; unweathered bedrock

Typic Vitrixerands, Forested, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and backslopes
Geomorphic position, three-dimensional: Mountaintops and mountainflanks
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 50 inches) over colluvium, residuum, and glacial till
Slope: 35 to 60 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir series, Eastern Washington (CD)

Typical profile
C—0 to 1 inch; ashy sandy loam
A—1 to 5 inches; gravelly ashy sandy loam
Bw1—5 to 10 inches; gravelly ashy sandy loam
Bw2—10 to 22 inches; very gravelly ashy sandy loam
2CB—22 to 32 inches; very gravelly sandy loam
2R—32 to 36 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 30 to 60 percent. The land capability classification is 8.

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

714—Xeric Vitricryands-Andic Eutrocryepts complex, till substratum, 5 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 3,900 to 5,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Xeric Vitricryands, forested, till substratum, and similar soils: 65 percent
Andic Eutrocryepts, xeric, forested, till substratum, and similar soils: 35 percent

Xeric Vitricryands, Forested, Till Substratum, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks
Down-slope shape: Concave
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (14 to 50 inches) over colluvium, residuum, and glacial till from granite and sedimentary rock
Slope: 5 to 35 percent
Depth to restrictive feature: 20 to 81 inches to dense material
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir–Engelmann spruce closed forest series, Eastern Washington (CE)

Typical profile
A—0 to 9 inches; gravelly ashy fine sandy loam
Bw1—9 to 18 inches; gravelly ashy fine sandy loam
Bw2—18 to 25 inches; very gravelly ashy fine sandy loam
2BC—25 to 34 inches; very gravelly loamy coarse sand
2C1—34 to 40 inches; very gravelly coarse sandy loam
2C2—40 to 60 inches; extremely gravelly coarse sandy loam

Andic Eutrocryepts, Xeric, Forested, Till Substratum, and Similar Soils

Setting

Landform: Mountains and glacial-trough valleys
Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities

Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 5 to 35 percent
Depth to restrictive feature: 20 to 81 inches to dense material
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification, nonirrigated: 6e
Plant community classification: Subalpine fir–Engelmann spruce closed forest series, Eastern Washington (CE)

Typical profile

A—0 to 7 inches; very cobbly ashy fine sandy loam
Bw—7 to 14 inches; ashy fine sandy loam
2BC—14 to 31 inches; very gravelly loamy coarse sand
2C1—31 to 40 inches; loamy coarse sand
2C2—40 to 60 inches; very gravelly loamy coarse sand

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

900—Andic Dystrocryepts-Andic Haplocryods-Cryofluvents association, till substratum, 0 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 3,400 to 4,800 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 36 to 39 degrees F
Frost-free period: 50 to 90 days

Map Unit Composition

Andic Dystrocryepts, udic, forested, till substratum, and similar soils: 45 percent
Andic Haplocryods, till substratum, and similar soils: 25 percent
Cryofluvents, poorly drained, till substratum, and similar soils: 15 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Andic Dystrocryepts, Udic, Forested, Till Substratum, and Similar Soils

Setting
Landform: Glacial-trough mountain valleys
Geomorphic position, two-dimensional: Footslopes
Geomorphic position, three-dimensional: Mountainbases and the lower third of mountainflanks
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 81 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Pacific silver fir/rusty menziesia–Cascade azalea–blue (big) huckleberry group, Eastern Washington (PCFS5S2)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; ashy fine sandy loam
2Bw—4 to 10 inches; ashy fine sandy loam
3C—10 to 21 inches; cobbly sandy loam
3Cd—21 to 60 inches; gravelly loamy sand

Andic Haplocryods, Till Substratum, and Similar Soils

Setting
Landform: Mountains; glacial-trough valleys
Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and the lower third of mountainflanks
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 5 to 25 percent
Depth to restrictive feature: 20 to 81 inches to dense material
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Parkland Zone, subalpine larch subseries, Eastern Washington (CAC1)

Typical profile
E—0 to 2 inches; ashy fine sandy loam
Bs1—2 to 10 inches; ashy sandy loam
Bs2—10 to 14 inches; gravelly ashy sandy loam
2BC—14 to 22 inches; very gravelly sandy loam
2C—22 to 34 inches; extremely cobbly sandy loam
2Cd—34 to 60 inches; extremely cobbly sandy loam

Cryofluvents, Poorly Drained, Till Substratum, and Similar Soils

Setting
Landform: Flood plains on low stream terraces on glacial-trough valley floors on mountains
Geomorphic position, two-dimensional: Toeslopes
Geomorphic position, three-dimensional: Mountainbases, talfs, rises, and dips
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Less than 7 inches of volcanic ash over alluvium
Slope: 0 to 5 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Poorly drained
Capacity of the most limiting soil layer to transmit water (Ksat): Moderately high
Frequency of flooding: Occasional (See Water Features table.)
Frequency of ponding: Rare (See Water Features table.)
Seasonal high water table, minimum depth: 12 to 20 inches (See Water Features table.)
Available water capacity, entire profile: Low (about 4.9 inches)

Interpretive groups
Land capability classification, nonirrigated: 6w
Plant community classification: Western redcedar series, wetland (CCM0)

Typical profile
A1—0 to 3 inches; loam
A2—3 to 7 inches; sandy loam
C1—7 to 24 inches; stratified very gravelly loamy sand to sandy loam
C2—24 to 48 inches; stratified very gravelly coarse sand to sandy loam
C3—48 to 60 inches; stratified very gravelly coarse sand to sandy loam

Named Dissimilar Minor Components

Chutes
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

901—Andic Dystrocryepts-Typic Vitricryands association, till substratum, 35 to 75 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 4,100 to 5,800 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Andic Dystrocryepts, udic, forested, till substratum, and similar soils: 55 percent
Typic Vitricryands, till substratum, forested, and similar soils: 30 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Andic Dystrocryepts, Udic, Forested, Till Substratum, and Similar Soils

Setting
Landform: Glacial-trough mountain valleys
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Lower and center thirds of mountainflanks
Aspect, representative: Southwest
Aspect, range: South to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 35 to 75 percent
Depth to restrictive feature: 20 to 81 inches to dense material
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Pacific silver fir/rusty menziesia–Cascade azalea–blue (big) huckleberry group, Eastern Washington (PCFS5S2)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; ashy fine sandy loam
2Bw—4 to 10 inches; ashy fine sandy loam
3C—10 to 21 inches; cobbly sandy loam
3Cd—21 to 60 inches; gravelly loamy sand

Typic Vitricryands, Till Substratum, Forested, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Down-slope shape: Concave
Aspect, representative: Southwest
Aspect, range: South to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 50 inches) over colluvium, residuum, and glacial till
Slope: 35 to 75 percent
Depth to restrictive feature: 20 to 81 inches to dense material
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 8.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Pacific silver fir/blue (big) huckleberry/dwarf bramble group, Eastern Washington (PCFS2S4)

Typical profile
A—0 to 5 inches; ashy silt loam
Bw1—5 to 15 inches; gravelly ashy fine sandy loam
Bw2—15 to 21 inches; gravelly ashy fine sandy loam
2BC—21 to 29 inches; very gravelly sandy loam
2Cd—29 to 60 inches; extremely gravelly loamy coarse sand

Named Dissimilar Minor Components

Andic Haplocryods
Composition: 5 percent
Landform: Glacial-trough valleys on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Chutes
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

902—Andic Dystrocryepts-Vitrandic Dystrocryepts-Rock outcrop association, 60 to 90 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 4,900 to 6,800 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Andic Dystrocryepts, udic, forested, and similar soils: 45 percent
Vitrandic Dystrocryepts, udic, nonforested, and similar soils: 25 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Andic Dystrocryepts, Udic, Forested, and Similar Soils

Setting
Landform: Dissecting avalanche chutes on mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks
Aspect, representative: Southwest
Aspect, range: Southeast to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 60 to 90 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Parkland Zone, whitebark pine subseries, Eastern Washington (CAC4)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; ashy fine sandy loam
2Bw—4 to 10 inches; ashy fine sandy loam
3C1—10 to 21 inches; cobbly sandy loam
3C2—21 to 60 inches; gravelly loamy sand

Vitrandic Dystrocryepts, Udic, Nonforested, and Similar Soils

Setting
Landform: Mountains and avalanche chutes
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Aspect, representative: Southwest
Aspect, range: Southeast to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 25 inches) over colluvium and residuum from mixed rock sources
Slope: 60 to 90 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None

Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Subalpine Park (R006XY704WA)

Typical profile
A1—0 to 4 inches; gravelly ashy sandy loam
A2—4 to 12 inches; gravelly ashy sandy loam
Bw—12 to 20 inches; very gravelly ashy sandy loam
2C—20 to 31 inches; extremely gravelly sandy loam
2R—31 to 35 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 60 to 90 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Chutes
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Typic Vitricryands
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

903—Andic Dystrudepts-Typic Udivitrands-Rock outcrop association, 35 to 75 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 3,000 to 5,000 feet
Mean annual precipitation: 50 to 70 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 85 to 120 days

Map Unit Composition

Andic Dystrudepts and similar soils: 45 percent
Typic Udivitrands and similar soils: 30 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 2 percent
Unnamed dissimilar minor components: 8 percent

Andic Dystrudepts and Similar Soils

Setting
Landform: Glacial-trough mountain valleys

Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 35 to 75 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Western hemlock/vine maple–Cascade Oregon grape–pachistima group, Eastern Washington (PCHS2S1)

Typical profile
A—0 to 5 inches; gravelly ashy sandy loam
Bw—5 to 12 inches; gravelly ashy sandy loam
2BC—12 to 22 inches; very gravelly sandy loam
2C—22 to 48 inches; extremely gravelly sandy loam
2R—48 to 52 inches; unweathered bedrock

Typic Udivitrands and Similar Soils

Setting
Landform: Glacial-trough valleys on mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 25 inches) over colluvium, residuum, and glacial till
Slope: 35 to 75 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Western hemlock/vine maple–Cascade Oregon grape–pachistima group, Eastern Washington (PCHS2S1)

Typical profile
C—0 to 1 inch; ashy sandy loam
2A—1 to 7 inches; gravelly ashy sandy loam
2Bw—7 to 21 inches; gravelly ashy sandy loam

3C1—21 to 36 inches; very gravelly sandy loam
3C2—36 to 60 inches; very gravelly sandy loam

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 75 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Andic Dystrocryepts
Composition: 2 percent
Landform: Glacial-trough valleys on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

904—Andic Haplocryods-Rock outcrop association, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 6,000 to 8,000 feet
Mean annual precipitation: 60 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Andic Haplocryods and similar soils: 65 percent
Rock outcrop: 20 percent
Named dissimilar minor components: 3 percent
Unnamed dissimilar minor components: 12 percent

Andic Haplocryods and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks
Aspect, representative: Southeast
Aspect, range: North to west (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Parkland Zone, subalpine larch subseries, Eastern Washington (CAC1)

Typical profile
E—0 to 2 inches; ashy fine sandy loam
Bs1—2 to 10 inches; ashy sandy loam
Bs2—10 to 14 inches; gravelly ashy sandy loam
2BC—14 to 22 inches; very gravelly sandy loam
2C—22 to 34 inches; extremely cobbly sandy loam
2R—34 to 38 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 35 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Typic Vitricryands
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

905—Andic Haplocryods-Rock outcrop association, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 6,000 to 8,000 feet
Mean annual precipitation: 60 to 90 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Andic Haplocryods and similar soils: 65 percent
Rock outcrop: 20 percent
Named dissimilar minor components: 8 percent
Unnamed dissimilar minor components: 7 percent

Andic Haplocryods and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Parkland Zone, subalpine larch subseries, Eastern Washington (CAC1)

Typical profile
E—0 to 2 inches; ashy fine sandy loam
Bs1—2 to 10 inches; ashy sandy loam
Bs2—10 to 14 inches; gravelly ashy sandy loam
2BC—14 to 22 inches; very gravelly sandy loam
2C—22 to 34 inches; extremely cobbly sandy loam
2R—34 to 38 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Andic Dystrocryrepts
Composition: 6 percent
Landform: Cirques
Geomorphic position, two-dimensional: Shoulders and backslopes

Typic Vitricryands
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

906—Andic Haplocryods-Typic Vitricryands association, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 4,000 to 5,800 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Andic Haplocryods and similar soils: 50 percent
Typic Vitricryands, forested, and similar soils: 30 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 10 percent

Andic Haplocryods and Similar Soils

Setting

Landform: Mountains and glacial-trough valleys
Geomorphic position, two-dimensional: Backslopes
Geomorphic position, three-dimensional: Mountainbases and mountainflanks
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities

Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.1 inches)

Interpretive groups

Land capability classification, nonirrigated: 7e
Plant community classification: Parkland Zone, subalpine larch subseries, Eastern Washington (CAC1)

Typical profile

E—0 to 2 inches; ashy fine sandy loam
Bs1—2 to 10 inches; ashy sandy loam
Bs2—10 to 13 inches; gravelly ashy sandy loam
2BC—13 to 22 inches; very gravelly sandy loam
2C—22 to 34 inches; extremely cobbly sandy loam
2R—34 to 38 inches; unweathered bedrock

Typic Vitricryands, Forested, and Similar Soils

Setting

Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Down-slope shape: Concave
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities

Parent material: Volcanic ash (14 to 50 inches) over colluvium, residuum, and glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None

Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Pacific silver fir/rusty menziesia–Cascade azalea–blue (big) huckleberry group, Eastern Washington (PCFS5S2)

Typical profile
C—0 to 1 inch; ashy fine sandy loam
2A—1 to 7 inches; gravelly ashy sandy loam
2Bw—7 to 18 inches; gravelly ashy sandy loam
3BC—18 to 26 inches; very gravelly sandy loam
3C—26 to 48 inches; very gravelly sandy loam
3R—48 to 52 inches; unweathered bedrock

Named Dissimilar Minor Components

Andic Eutrocryepts
Composition: 5 percent
Landform: Glacial-trough valleys on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Andic Dystrocryepts, till substratum
Composition: 3 percent
Landform: Glacial-trough valleys on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Fulvicryands
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

907—Andic Haplocryods-Typic Vitricryands, till substratum, complex, 5 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 4,000 to 5,800 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Andic Haplocryods, till substratum, and similar soils: 65 percent
Typic Vitricryands, till substratum, forested, and similar soils: 35 percent

Andic Haplocryods, Till Substratum, and Similar Soils

Setting
Landform: Glacial-trough valleys on mountains
Geomorphic position, two-dimensional: Footslopes
Geomorphic position, three-dimensional: Mountainbases
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 5 to 25 percent
Depth to restrictive feature: 20 to 81 inches to dense material
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Parkland Zone, subalpine larch subseries, Eastern Washington (CAC1)

Typical profile
E—0 to 2 inches; ashy fine sandy loam
Bs1—2 to 10 inches; ashy sandy loam
Bs2—10 to 13 inches; gravelly ashy sandy loam
2BC—13 to 22 inches; very gravelly sandy loam
2C—22 to 34 inches; extremely cobbly sandy loam
2Cd—34 to 60 inches; extremely cobbly sandy loam

Typic Vitricryands, Till Substratum, Forested, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Down-slope shape: Concave
Aspect, representative: North
Aspect, range: All aspects

Properties and qualities
Parent material: Volcanic ash (14 to 50 inches) over colluvium, residuum, and glacial till
Slope: 5 to 25 percent
Depth to restrictive feature: 20 to 81 inches to dense material
Drainage class: Somewhat excessively drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 8.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Pacific silver fir/rusty menziesia–Cascade azalea–blue (big) huckleberry group, Eastern Washington (PCFS5S2)

Typical profile
A—0 to 5 inches; ashy silt loam
Bw1—5 to 15 inches; gravelly ashy fine sandy loam
Bw2—15 to 21 inches; gravelly ashy fine sandy loam
2BC—21 to 29 inches; very gravelly sandy loam
2Cd—29 to 60 inches; extremely gravelly loamy coarse sand

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

908—Andic Haplocryods-Vitrandic Dystrocryepts-Rock outcrop association, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 5,900 to 7,200 feet
Mean annual precipitation: 60 to 90 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Andic Haplocryods and similar soils: 50 percent
Vitrandic Dystrocryepts, udic, nonforested, and similar soils: 25 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 10 percent

Andic Haplocryods and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks
Aspect, representative: Northeast
Aspect, range: Southwest to south (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Parkland Zone, subalpine larch subseries, Eastern Washington (CAC1)

Typical profile
E—0 to 2 inches; ashy fine sandy loam
Bs1—2 to 10 inches; ashy sandy loam
Bs2—10 to 14 inches; gravelly ashy sandy loam
2BC—14 to 22 inches; very gravelly sandy loam

2C—22 to 34 inches; extremely cobbly sandy loam
2R—34 to 38 inches; unweathered bedrock

Vitrandic Dystrocryepts, Udic, Nonforested, and Similar Soils

Setting
Landform: Mountains; basins and headwalls of cirques
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountaintops and mountainflanks
Aspect, representative: Northeast
Aspect, range: Southwest to south (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 25 inches) over colluvium and residuum from mixed rock sources
Slope: 15 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Ecological site: Subalpine Park (R006XY704WA)

Typical profile
A1—0 to 4 inches; gravelly ashy sandy loam
A2—4 to 12 inches; gravelly ashy sandy loam
Bw—12 to 20 inches; very gravelly ashy sandy loam
2C—20 to 31 inches; extremely gravelly sandy loam
2R—31 to 35 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 25 to 35 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Andic Dystrocryepts
Composition: 5 percent
Landform: Glacial-trough valleys on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Typic Vitricryands
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

909—Andic Haplocryods-Vitrandic Dystrocryepts-Rock outcrop association, 35 to 90 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 5,800 to 8,000 feet
Mean annual precipitation: 60 to 90 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Andic Haplocryods and similar soils: 55 percent
Vitrandic Dystrocryepts, udic, nonforested, and similar soils: 25 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 7 percent
Unnamed dissimilar minor components: 3 percent

Andic Haplocryods and Similar Soils

Setting

Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities

Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 35 to 90 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification, nonirrigated: 7e
Plant community classification: Parkland Zone, subalpine larch subseries, Eastern Washington (CAC1)

Typical profile

E—0 to 2 inches; ashy fine sandy loam
Bs1—2 to 10 inches; ashy sandy loam
Bs2—10 to 14 inches; gravelly ashy sandy loam
2BC—14 to 22 inches; very gravelly sandy loam
2C—22 to 34 inches; extremely cobbly sandy loam
2R—34 to 38 inches; unweathered bedrock

Vitrandic Dystrocryepts, Udic, Nonforested, and Similar Soils

Setting

Landform: Mountains, glacial-trough valleys, and avalanche chutes
Geomorphic position, two-dimensional: Footslopes and backslopes

Geomorphic position, three-dimensional: Mountainflanks, mountainbases, and mountaintops
Down-slope shape: Concave
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 25 inches) over colluvium and residuum from mixed rock sources
Slope: 35 to 90 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Ecological site: Subalpine Park (R006XY704WA)

Typical profile
A1—0 to 4 inches; gravelly ashy sandy loam
A2—4 to 12 inches; gravelly ashy sandy loam
Bw—12 to 20 inches; very gravelly ashy sandy loam
2C—20 to 31 inches; extremely gravelly sandy loam
2R—31 to 35 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 90 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Andic Dystrocryrepts
Composition: 4 percent

Typic Vitricryands
Composition: 3 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

910—Rock outcrop-Andic Dystrocryepts association, 35 to 90 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 4,900 to 6,000 feet
Mean annual precipitation: 40 to 80 inches

Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Rock outcrop: 50 percent
Andic Dystrocryepts, udic, forested, and similar soils: 35 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 90 percent. The land capability classification is 8.

Andic Dystrocryepts, Udic, Forested, and Similar Soils

Setting
Landform: Dissecting avalanche chutes on mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks
Aspect, representative: Northeast
Aspect, range: North to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 35 to 90 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry–twinflower group, Eastern Washington (PCES3F2)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; ashy fine sandy loam
2Bw—4 to 10 inches; ashy fine sandy loam
3C1—10 to 21 inches; cobbly sandy loam
3C2—21 to 60 inches; gravelly loamy sand

Named Dissimilar Minor Components

Typic Vitricryands
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

911—Rock outcrop-Andic Dystrocryepts-Chutes, avalanche, association, 60 to 90 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 5,000 to 6,800 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Rock outcrop: 35 percent
Andic Dystrocryepts, udic, forested, and similar soils: 30 percent
Chutes, avalanche: 25 percent
Named dissimilar minor components: 3 percent
Unnamed dissimilar minor components: 7 percent

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 60 to 90 percent. The land capability classification is 8.

Andic Dystrocryepts, Udic, Forested, and Similar Soils

Setting
Landform: Dissecting avalanche chutes on mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks
Aspect, representative: West
Aspect, range: South to northwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 60 to 90 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Parkland Zone, mountain hemlock subseries, Eastern Washington (CAC6)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; ashy fine sandy loam
2Bw—4 to 10 inches; ashy fine sandy loam
3C1—10 to 21 inches; cobbly sandy loam
3C2—21 to 60 inches; gravelly loamy sand

Chutes, Avalanche

Chutes, avalanche, consist of areas with a central channel-like corridor, scar, or depression along which an avalanche has moved. They may take the form of an open

path in a forest, with bent and broken trees, or an eroded surface marked by pits, scratches, and grooves. The land capability classification is 8.

Named Dissimilar Minor Components

Andic Haplocryods
Composition: 3 percent
Landform: Glacial-trough valleys on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

912—Rock outcrop-Lithic Haploxerepts-Vitrandic Haploxerepts association, 35 to 75 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,000 to 5,000 feet
Mean annual precipitation: 20 to 25 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Rock outcrop: 50 percent
Lithic Haploxerepts, forested, and similar soils: 25 percent
Vitrandic Haploxerepts and similar soils: 15 percent
Unnamed dissimilar minor components: 10 percent

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 75 percent. The land capability classification is 8.

Lithic Haploxerepts, Forested, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over bedrock
Slope: 35 to 75 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7s
Plant community classification: Douglas-fir/pinegrass–elk sedge group, Eastern Washington (PCDG1)

Typical profile
A—0 to 3 inches; cobbly ashy sandy loam
Bw—3 to 12 inches; cobbly ashy sandy loam
2C—12 to 18 inches; very gravelly sandy loam
2R—18 to 22 inches; unweathered bedrock

Vitrandic Haploxerepts and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 22 inches) over colluvium and residuum from volcanic and sedimentary rock
Slope: 35 to 75 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass–elk sedge group, Eastern Washington (PCDG1)

Typical profile
A—0 to 4 inches; stony ashy sandy loam
Bw1—4 to 9 inches; gravelly ashy sandy loam
Bw2—9 to 15 inches; gravelly ashy sandy loam
BC—15 to 22 inches; gravelly sandy loam
2C1—22 to 35 inches; very gravelly sandy loam
2C2—35 to 45 inches; very gravelly sandy loam
2R—45 to 49 inches; unweathered bedrock

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

913—Rock outcrop-Lithic Vitricryands association, 60 to 90 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 5,200 to 7,200 feet
Mean annual precipitation: 40 to 80 inches

Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Rock outcrop: 55 percent
Lithic Vitricryands, forested, udic, and similar soils: 40 percent
Unnamed dissimilar minor components: 5 percent

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 60 to 90 percent. The land capability classification is 8.

Lithic Vitricryands, Forested, Udic, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (8 to 20 inches) over colluvium and residuum
Slope: 60 to 90 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Parkland Zone, subalpine fir subseries, Eastern Washington (CAC5)

Typical profile
A—0 to 4 inches; very stony ashy sandy loam
Bw1—4 to 10 inches; very stony ashy sandy loam
Bw2—10 to 18 inches; very stony ashy sandy loam
2R—18 to 22 inches; unweathered bedrock

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

914—Rock outcrop-Rubble land-Glaciers, snow fields, association, 15 to 100 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains

Map Unit Composition

Rock outcrop: 55 percent
Rubble land: 20 percent

Glaciers, snowfields: 10 percent
Unnamed dissimilar minor components: 15 percent

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 15 to 100 percent. The land capability classification is 8.

Rubble Land

Rubble land consists of colluvial deposits of gravel, cobbles, stones, and boulders. Voids between the fragments contain little or no soil material. Slopes range from 15 to 100 percent. Rubble land is typically underlain by bedrock at a depth of more than 40 inches. The land capability classification is 8.

Glaciers, Snowfields

Glaciers, snowfields, consist of areas of ice that formed by accumulation, compaction, and recrystallization of snow and that flows or flowed under the influence of gravity. Snowfields are areas of perennial snow. The land capability classification is 8.

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

915—Rock outcrop-Vitrandic Dystrocryepts association, 35 to 90 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 6,200 to 8,000 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Rock outcrop: 50 percent
Vitrandic Dystrocryepts, udic, nonforested, and similar soils: 35 percent
Named dissimilar minor components: 15 percent

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 90 percent. The land capability classification is 8.

Vitrandic Dystrocryepts, Udic, Nonforested, and Similar Soils

Setting
Landform: Mountains, glacial-trough valleys, and avalanche chutes
Geomorphic position, two-dimensional: Backslopes and footslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Down-slope shape: Concave
Aspect, representative: Southeast
Aspect, range: Northeast to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 25 inches) over colluvium and residuum from mixed rock sources

Slope: 35 to 90 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Subalpine Park (R006XY704WA)

Typical profile
A1—0 to 4 inches; gravelly ashy sandy loam
A2—4 to 12 inches; gravelly ashy sandy loam
Bw—12 to 20 inches; very gravelly ashy sandy loam
2C—20 to 31 inches; extremely gravelly sandy loam
2R—31 to 35 inches; unweathered bedrock

Named Dissimilar Minor Components

Andic Haplocryods
Composition: 5 percent
Landform: Glacial-trough valleys on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Lithic Dystrocryepts
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Typic Vitricryands
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

916—Rock outcrop-Vitrandic Dystrudepts association, 60 to 90 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 3,500 to 5,500 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 85 to 120 days

Map Unit Composition

Rock outcrop: 50 percent
Vitrandic Dystrudepts and similar soils: 35 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 60 to 90 percent. The land capability classification is 8.

Vitrandic Dystrudepts and Similar Soils

Setting
Landform: Avalanche chutes on mountains
Geomorphic position, two-dimensional: Shoulders and backslopes
Geomorphic position, three-dimensional: Mountainflanks and mountainbases
Aspect, representative: Southwest
Aspect, range: East to north (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium and residuum
Slope: 60 to 90 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Very low (about 2.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Western hemlock/vine maple–Cascade Oregon grape–pachistima group, Eastern Washington (PCHS2S1)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw—4 to 11 inches; very gravelly sandy loam
2BC—11 to 20 inches; extremely gravelly sandy loam
2C—20 to 27 inches; very gravelly sandy loam
2R—27 to 31 inches; unweathered bedrock

Named Dissimilar Minor Components

Andic Dystrocryepts
Composition: 5 percent
Landform: Glacial-trough valleys on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Lithic Dystrocryepts
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

917—Typic Udivitrands-Andic Dystrudepts association, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 2,100 to 4,600 feet
Mean annual precipitation: 50 to 70 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 85 to 120 days

Map Unit Composition

Typic Udivitrands and similar soils: 50 percent
Andic Dystrudepts and similar soils: 35 percent
Named dissimilar minor components: 8 percent
Unnamed dissimilar minor components: 7 percent

Typic Udivitrands and Similar Soils

Setting
Landform: Glacial-trough valleys on mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 25 inches) over colluvium, residuum, and glacial till
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.2 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Western hemlock/vine maple–Cascade Oregon grape–pachistima group, Eastern Washington (PCHS2S1)

Typical profile
C—0 to 1 inch; ashy sandy loam
2A—1 to 7 inches; gravelly ashy sandy loam
2Bw—7 to 21 inches; gravelly ashy sandy loam
3C1—21 to 36 inches; very gravelly sandy loam
3C2—36 to 60 inches; very gravelly sandy loam

Andic Dystrudepts and Similar Soils

Setting
Landform: Glacial-trough mountain valleys

Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 35 to 65 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Western hemlock/vine maple–Cascade Oregon grape–pachistima group, Eastern Washington (PCHS2S1)

Typical profile
A—0 to 5 inches; gravelly ashy sandy loam
Bw—5 to 12 inches; gravelly ashy sandy loam
2BC—12 to 22 inches; very gravelly sandy loam
2C—22 to 48 inches; extremely gravelly sandy loam
2R—48 to 52 inches; unweathered bedrock

Named Dissimilar Minor Components

Typic Vitricryands
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Rock outcrop
Composition: 3 percent

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

918—Typic Udivitrands-Andic Dystrudepts association, 65 to 90 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 2,100 to 4,600 feet
Mean annual precipitation: 50 to 70 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 85 to 120 days

Map Unit Composition

Typic Udivitrands and similar soils: 60 percent
Andic Dystrudepts and similar soils: 25 percent

Named dissimilar minor components: 7 percent
Unnamed dissimilar minor components: 8 percent

Typic Udivitrands and Similar Soils

Setting

Landform: Mountains; glacial-trough valleys
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Aspect, representative: Northwest
Aspect, range: Southwest to northeast (clockwise)

Properties and qualities

Parent material: Volcanic ash (14 to 25 inches) over colluvium, residuum, and glacial till
Slope: 65 to 90 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.2 inches)

Interpretive groups

Land capability classification, nonirrigated: 7e
Plant community classification: Western hemlock/vine maple–Cascade Oregon grape–pachistima group, Eastern Washington (PCHS2S1)

Typical profile

C—0 to 1 inch; ashy sandy loam
2A—1 to 7 inches; gravelly ashy sandy loam
2Bw—7 to 21 inches; gravelly ashy sandy loam
3C1—21 to 36 inches; very gravelly sandy loam
3C2—36 to 60 inches; very gravelly sandy loam

Andic Dystrudepts and Similar Soils

Setting

Landform: Glacial-trough mountain valleys
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks
Aspect, representative: Northwest
Aspect, range: Southwest to northeast (clockwise)

Properties and qualities

Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 65 to 90 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.5 inches)

Interpretive groups

Land capability classification, nonirrigated: 7e
Plant community classification: Western hemlock/vine maple–Cascade Oregon grape–pachistima group, Eastern Washington (PCHS2S1)

Typical profile
A—0 to 5 inches; gravelly ashy sandy loam
Bw—5 to 12 inches; gravelly ashy sandy loam
2BC—12 to 22 inches; very gravelly sandy loam
2C—22 to 48 inches; extremely gravelly sandy loam
2R—48 to 52 inches; unweathered bedrock

Named Dissimilar Minor Components

Typic Vitricryands
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

919—Typic Vitricryands, 5 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 5,100 to 6,200 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Typic Vitricryands, forested, and similar soils: 85 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Typic Vitricryands, Forested, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Down-slope shape: Concave
Aspect, representative: Northwest
Aspect, range: Southwest to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 50 inches) over colluvium, residuum, and glacial till
Slope: 5 to 35 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 6e
Plant community classification: Pacific silver fir/rusty menziesia–Cascade azalea–blue (big) huckleberry group, Eastern Washington (PCFS5S2)

Typical profile
C—0 to 1 inch; ashy fine sandy loam
2A—1 to 7 inches; gravelly ashy sandy loam
2Bw—7 to 18 inches; gravelly ashy sandy loam
3BC—18 to 26 inches; very gravelly sandy loam
3C—26 to 48 inches; very gravelly sandy loam
3R—48 to 52 inches; unweathered bedrock

Named Dissimilar Minor Components

Andic Haplocryods, till substratum
Composition: 5 percent
Landform: Glacial-trough valleys on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Andic Eutrocryepts, till substratum
Composition: 3 percent
Landform: Glacial-trough valleys on mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks

Rock outcrop
Composition: 2 percent

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

920—Typic Vitricryands-Andic Haplocryods-Fulvicryands association, 35 to 90 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 4,000 to 5,800 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Typic Vitricryands, forested, and similar soils: 50 percent
Andic Haplocryods and similar soils: 25 percent
Fulvicryands and similar soils: 10 percent
Named dissimilar minor components: 3 percent
Unnamed dissimilar minor components: 12 percent

Typic Vitricryands, Forested, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes

Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Down-slope shape: Concave
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 50 inches) over colluvium, residuum, and glacial till
Slope: 35 to 90 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Pacific silver fir/rusty menziesia–Cascade azalea–blue (big) huckleberry group, Eastern Washington (PCFS5S2)

Typical profile
C—0 to 1 inch; ashy fine sandy loam
2A—1 to 7 inches; gravelly ashy sandy loam
2Bw—7 to 18 inches; gravelly ashy sandy loam
3BC—18 to 26 inches; very gravelly sandy loam
3C—26 to 48 inches; very gravelly sandy loam
3R—48 to 52 inches; unweathered bedrock

Andic Haplocryods and Similar Soils

Setting
Landform: Glacial-trough valleys on mountains
Geomorphic position, two-dimensional: Shoulders and backslopes
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 35 to 90 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.1 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Pacific silver fir series, Eastern Washington (CF)

Typical profile
E—0 to 2 inches; ashy fine sandy loam
Bs1—2 to 10 inches; ashy sandy loam
Bs2—10 to 13 inches; gravelly ashy sandy loam

2BC—13 to 22 inches; very gravelly sandy loam
2C—22 to 34 inches; extremely cobbly sandy loam
2R—34 to 38 inches; unweathered bedrock

Fulvicryands and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: Southwest to east (clockwise)

Properties and qualities
Parent material: Volcanic ash mixed with colluvium over fragmental material
Slope: 35 to 90 percent
Depth to restrictive feature: 20 to 40 inches to strongly contrasting textural stratification
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.4 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Sitka alder series, riparian (SW21)

Typical profile
A1—0 to 5 inches; very stony medial sandy loam
A2—5 to 12 inches; gravelly medial sandy loam
Bw—12 to 18 inches; very gravelly medial sandy loam
2C1—18 to 28 inches; extremely cobbly sandy loam
2C2—28 to 60 inches; fragmental material

Named Dissimilar Minor Components

Rock outcrop
Composition: 3 percent

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

921—Typic Vitricryands-Rock outcrop association, 35 to 75 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 4,800 to 6,400 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Typic Vitricryands, forested, and similar soils: 60 percent
Rock outcrop: 35 percent
Named dissimilar minor components: 5 percent

Typic Vitricryands, Forested, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops
Down-slope shape: Concave
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 50 inches) over colluvium, residuum, and glacial till
Slope: 35 to 75 percent
Depth to restrictive feature: 20 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Parkland Zone, subalpine fir subseries, Eastern Washington (CAC5)

Typical profile
C—0 to 1 inch; ashy fine sandy loam
2A—1 to 7 inches; gravelly ashy sandy loam
2Bw—7 to 18 inches; gravelly ashy sandy loam
3BC—18 to 26 inches; very gravelly sandy loam
3C—26 to 48 inches; very gravelly sandy loam
3R—48 to 52 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 75 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Lithic Vitricryands
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

922—Typic Vitrixerands-Andic Haploxerepts-Rock outcrop association, 35 to 75 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,900 to 5,000 feet

Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 85 to 120 days

Map Unit Composition

Typic Vitrixerands, forested, and similar soils: 50 percent
Andic Haploxerepts, forested, and similar soils: 25 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 9 percent
Unnamed dissimilar minor components: 6 percent

Typic Vitrixerands, Forested, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Shoulders and backslopes
Geomorphic position, three-dimensional: Mountaintops and mountainflanks
Aspect, representative: North
Aspect, range: West to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (14 to 50 inches) over colluvium, residuum, and glacial till
Slope: 35 to 75 percent
Depth to restrictive feature: 20 to 81 inches to densic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.8 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass–elk sedge group, Eastern Washington (PCDG1)

Typical profile
C—0 to 1 inch; ashy sandy loam
A—1 to 5 inches; gravelly ashy sandy loam
Bw1—5 to 10 inches; gravelly ashy sandy loam
Bw2—10 to 22 inches; very gravelly ashy sandy loam
2CB—22 to 32 inches; very gravelly sandy loam
2R—32 to 36 inches; unweathered bedrock

Andic Haploxerepts, Forested, and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops
Aspect, representative: North
Aspect, range: West to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, or residuum
Slope: 35 to 75 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock

Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 8.5 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir series, Eastern Washington (CD)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw1—4 to 13 inches; gravelly ashy sandy loam
2Bw2—13 to 28 inches; very gravelly ashy sandy loam
2C1—28 to 36 inches; very gravelly sandy loam
2C2—36 to 60 inches; very gravelly sandy loam

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 75 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Xeric Vitricryands
Composition: 9 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

923—Vitrandic Dystrocryepts, 5 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains
Elevation: 5,800 to 6,800 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days

Map Unit Composition

Vitrandic Dystrocryepts, udic, nonforested, and similar soils: 85 percent
Named dissimilar minor components: 15 percent

Vitrandic Dystrocryepts, Udic, Nonforested, and Similar Soils

Setting
Landform: Glacial moraines
Aspect, representative: South
Aspect, range: East to west (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (7 to 25 inches) over colluvium and residuum from mixed rock sources

Slope: 5 to 35 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 3.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Ecological site: Subalpine Park (R006XY704WA)

Typical profile
A1—0 to 4 inches; gravelly ashy sandy loam
A2—4 to 12 inches; gravelly ashy sandy loam
Bw—12 to 20 inches; very gravelly ashy sandy loam
2C—20 to 31 inches; extremely gravelly sandy loam
2R—31 to 35 inches; unweathered bedrock

Named Dissimilar Minor Components

Andic Dystrocryepts
Composition: 5 percent
Landform: Glacial-trough valleys on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Lithic Dystrocryepts
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Upper third of mountainflanks; mountaintops

Rock outcrop
Composition: 5 percent

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

924—Vitrandic Haploxerepts, 15 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,500 to 4,900 feet
Mean annual precipitation: 20 to 25 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Vitrandic Haploxerepts and similar soils: 85 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Vitrandic Haploxerepts and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: Southeast
Aspect, range: Northeast to south (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 22 inches) over colluvium and residuum from volcanic and sedimentary rock
Slope: 15 to 35 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 4e
Plant community classification: Douglas-fir/pinegrass–elk sedge group, Eastern Washington (PCDG1)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw1—4 to 9 inches; gravelly ashy sandy loam
Bw2—9 to 15 inches; very gravelly ashy sandy loam
BC—15 to 22 inches; gravelly ashy sandy loam
2C1—22 to 35 inches; very gravelly sandy loam
2C2—35 to 45 inches; very gravelly sandy loam
2R—45 to 49 inches; unweathered bedrock

Named Dissimilar Minor Components

Andic Haploxerepts
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks; mountaintops

Rock outcrop
Composition: 5 percent

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

925—Vitrandic Haploxerepts, 35 to 75 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 2,500 to 4,900 feet
Mean annual precipitation: 20 to 25 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Vitrandic Haploxerepts and similar soils: 85 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Vitrandic Haploxerepts and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: South
Aspect, range: East to southwest (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 22 inches) over colluvium and residuum from volcanic and sedimentary rock
Slope: 35 to 75 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass–elk sedge group, Eastern Washington (PCDG1)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw1—4 to 9 inches; gravelly ashy sandy loam
Bw2—9 to 15 inches; very gravelly ashy sandy loam
BC—15 to 22 inches; gravelly ashy sandy loam
2C1—22 to 35 inches; very gravelly sandy loam
2C2—35 to 45 inches; very gravelly sandy loam
2R—45 to 49 inches; unweathered bedrock

Named Dissimilar Minor Components

Rock outcrop
Composition: 5 percent

Rubble land
Composition: 5 percent

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

926—Vitrandic Haploxerepts-Rock outcrop association, 35 to 65 percent slopes

Map Unit Setting

Major land resource area (MLRA): 6—Cascade Mountains, Eastern Slope
Elevation: 3,200 to 5,000 feet

Mean annual precipitation: 20 to 25 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days

Map Unit Composition

Vitrandic Haploxerepts and similar soils: 70 percent
Rock outcrop: 15 percent
Named dissimilar minor components: 5 percent
Unnamed dissimilar minor components: 10 percent

Vitrandic Haploxerepts and Similar Soils

Setting
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks and mountaintops
Aspect, representative: Southeast
Aspect, range: Northeast to south (clockwise)

Properties and qualities
Parent material: Mixed volcanic ash (10 to 22 inches) over colluvium and residuum from volcanic and sedimentary rock
Slope: 35 to 65 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 4.6 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Douglas-fir/pinegrass–elk sedge group, Eastern Washington (PCDG1)

Typical profile
A—0 to 4 inches; gravelly ashy sandy loam
Bw1—4 to 9 inches; gravelly ashy sandy loam
Bw2—9 to 15 inches; very gravelly ashy sandy loam
BC—15 to 22 inches; gravelly ashy sandy loam
2C1—22 to 35 inches; very gravelly sandy loam
2C2—35 to 45 inches; very gravelly sandy loam
2R—45 to 49 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 65 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Chutes
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

927—Xeric Vitricryands-Andic Eutrocryepts-Rock outcrop association, 35 to 75 percent slopes

Map Unit Setting

Major land resource area (MLRA): 3—Olympic and Cascade Mountains and 6—Cascade Mountains, Eastern Slope
Elevation: 3,900 to 5,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Xeric Vitricryands, forested, and similar soils: 50 percent
Andic Eutrocryepts, xeric, forested, and similar soils: 25 percent
Rock outcrop: 10 percent
Named dissimilar minor components: 10 percent
Unnamed dissimilar minor components: 5 percent

Xeric Vitricryands, Forested, and Similar Soils

Setting

Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Mountainflanks
Aspect, representative: North
Aspect, range: West to northeast (clockwise)

Properties and qualities

Parent material: Volcanic ash (14 to 50 inches) over colluvium, residuum, and glacial till from granite and sedimentary rock
Slope: 35 to 75 percent
Restrictive feature: None noted within a depth of 60 inches
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry–twinflower group, Eastern Washington (PCES3F2)

Typical profile

A—0 to 5 inches; gravelly ashy sandy loam
Bw1—5 to 10 inches; gravelly ashy sandy loam
Bw2—10 to 17 inches; gravelly ashy sandy loam
2BC—17 to 25 inches; very gravelly sandy loam
2C—25 to 60 inches; very gravelly sandy loam

Andic Eutrocryepts, Xeric, Forested, and Similar Soils

Setting

Landform: Mountains
Geomorphic position, two-dimensional: Backslopes and shoulders
Geomorphic position, three-dimensional: Center and upper thirds of mountainflanks

Aspect, representative: North
Aspect, range: West to northeast (clockwise)

Properties and qualities
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 35 to 75 percent
Depth to restrictive feature: 20 to 81 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting soil layer to transmit water (Ksat): High
Frequency of flooding: None
Frequency of ponding: None
Seasonal high water table, minimum depth: More than 72 inches
Available water capacity, entire profile: Low (about 5.7 inches)

Interpretive groups
Land capability classification, nonirrigated: 7e
Plant community classification: Subalpine fir/blue (big) huckleberry–twinflower group, Eastern Washington (PCES3F2)

Typical profile
C—0 to 1 inch; ashy silt loam
2A—1 to 4 inches; ashy fine sandy loam
2Bw—4 to 10 inches; ashy fine sandy loam
3C—10 to 45 inches; cobbly sandy loam
3R—45 to 49 inches; unweathered bedrock

Rock Outcrop

Rock outcrop consists of exposures of bare bedrock. Slopes range from 35 to 75 percent. The land capability classification is 8.

Named Dissimilar Minor Components

Typic Vitricryands
Composition: 5 percent
Landform: Mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, and backslopes
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Andic Haplocryods
Composition: 3 percent
Landform: Glacial-trough valleys on mountains
Geomorphic position, two-dimensional: Toeslopes, footslopes, backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainbases, mountainflanks, and mountaintops

Chutes
Composition: 2 percent
Landform: Mountains
Geomorphic position, two-dimensional: Backslopes, shoulders, and summits
Geomorphic position, three-dimensional: Mountainflanks and mountaintops

Use and Management

Major uses: Recreation, watershed, and wildlife habitat

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information gathered for this survey can be used to plan the use and management of soils for crops and pasture; as rangeland and forestland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; for agricultural waste management; and as wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of gravel, sand, reclamation material, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Soil Survey Information on the Internet

Soil survey reports have traditionally contained tables providing the properties of the soils and interpretations regarding the use of the soils. The tables for this survey are available online from the Web Soil Survey at http://websoilsurvey.nrcs.usda.gov/app/. The information is provided online instead of in this publication so that the information can be more readily updated. The information on the Web Soil Survey is the official soil survey information.

The information listed below is currently available online for each soil map unit component. This list will expand with time as additional reports and interpretations are developed.

Soil Properties and Qualities

Chemical properties: Content of calcium carbonate, cation-exchange capacity, electrical conductivity (EC), and pH

Soil erosion factors: K-factor (whole soil and rock free), T-factor, wind erodibility group, and wind erodibility index

Physical properties: Available water capacity; bulk density; linear extensibility; content of organic matter, clay, sand, and silt; saturated hydraulic conductivity; surface texture; water content; liquid limit; and plasticity index

Soil qualities and features: Depth to restrictive layer, drainage class, frost action, and hydrologic soil group
Water features: Depth to water table and frequency of flooding and ponding

Suitabilities and Limitations for Use

Building site development: Risk of corrosion of steel and concrete and suitability for shallow excavations, dwellings, and other uses
Construction materials: Potential as a source of gravel, sand, roadfill, topsoil, and other materials
Disaster recovery planning: Suitability for disposal of animal carcasses in case of catastrophic mortality, suitability as a location for a composting facility, and other ratings
Land classification: Ecological site name and ID (number), farmland classification (prime, unique, and statewide importance), hydric rating by map unit, and irrigated and nonirrigated capability class and subclass
Land management: Forestry interpretations, including seedling mortality, suitability for hand planting, suitability for log landings, potential for damage by fire, harvest equipment operability, construction limitations for haul roads and landings, and other ratings
Military operations: Vehicle trafficability, suitability for evacuations, and other ratings
Recreational development: Suitability for camp areas, off-road motorcycle trails, paths and trails, picnic areas, and playgrounds
Sanitary facilities: Suitability for septic tank absorption fields, sanitary landfills, sewage lagoons, and daily cover for landfill
Vegetative productivity: Forest productivity, crop productivity index, range production, and yields of irrigated and nonirrigated crops by map unit or component
Waste management: Disposal of wastewater, treatment of wastewater, and land application of sewage sludge

Soil Reports

Building site development: Dwellings and small commercial buildings; and roads and streets, shallow excavations, and lawns and landscaping
Construction materials: Source of reclamation material and roadfill
Land classifications: Land capability classification, prime and other important farmlands, and taxonomic classification of the soils
Land management: Damage by fire and seedling mortality on forestland; forestland planting and harvesting; forestland site preparation; haul roads, log landings, and soil rutting on forestland; and hazard of erosion and suitability for roads on forestland
Recreational development: Camp areas, picnic areas, and playgrounds; and paths, trails, and golf fairways
Sanitary facilities: Landfills and sewage disposal
Soil chemical properties: Cation-exchange capacity and soil reaction
Soil erosion: RUSLE2 related attributes
Soil physical properties: Engineering properties and physical soil properties
Soil qualities and features: Restrictive layer, potential for frost action, and risk of corrosion
Vegetative productivity: Forestland productivity and rangeland productivity
Waste management: Agricultural disposal of manure, food-processing waste, and sewage sludge; agricultural disposal of wastewater by overland flow; agricultural disposal of wastewater by rapid infiltration and slow rate treatment; and large animal carcass disposal
Water features: Hydrologic group, water table, ponding, and flooding

Water management: Pond reservoir areas; embankments, dikes, and levees; aquifer-fed excavated ponds

Water Features

Table 5 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations. Only those map units in which a component has either a high water table, flooding, or ponding are listed in the table.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

Water table refers to a saturated zone in the soil. The table indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. The table indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year). Duration and surface water depth are not listed if the frequency of ponding is rare.

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year). Duration is not listed if the frequency of flooding is rare.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Table 5.--Water Features

[Depths of layers are in feet. See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Month	Water table		Ponding			Flooding	
		Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
		Ft	*Ft*	*Ft*				
101:								
Andic Dystrocryepts----	Jan-Dec	---	---	---	---	None	---	None
Aquic Dystrocryepts----	Mar-Jun	1.5-2.8	1.7-5.0	---	---	None	---	None
105:								
Andic Eutrocryepts-----	Jan-Dec	---	---	---	---	None	---	None
Cryaquolls-------------	Apr-May	1.0-1.7	>6.0	---	---	Rare	Brief	Occasional
	Jun-Jul	1.0-1.7	>6.0	---	---	Rare	---	None
106:								
Anglen-----------------	Jan-Apr	2.5-3.5	3.0-4.0	---	---	None	---	None
	December	2.5-3.5	3.0-4.0	---	---	None	---	None
107:								
Anglen-----------------	Jan-Apr	2.5-3.5	3.0-4.0	---	---	None	---	None
	December	2.5-3.5	3.0-4.0	---	---	None	---	None
108:								
Aquandic Cryaquepts----	January	1.8-2.3	>6.0	---	---	None	---	None
	February	1.4-1.8	>6.0	---	---	None	---	None
	March	0.8-1.4	>6.0	---	---	None	---	None
	Apr-Jun	0.0-0.8	>6.0	---	---	None	---	None
	July	0.8-1.4	>6.0	---	---	None	---	None
	August	1.4-1.8	>6.0	---	---	None	---	None
	September	1.8-2.3	>6.0	---	---	None	---	None
	December	2.3-6.0	>6.0	---	---	None	---	None
109:								
Aquandic Endoaquolls---	Jan-Mar	1.0-2.0	>6.0	---	---	None	---	None
	Apr-Aug	0.0-0.5	>6.0	0.3-1.0	Brief	Occasional	Brief	Occasional
	Sep-Dec	1.0-2.0	>6.0	---	---	None	---	None
110:								
Aquandic Endoaquolls---	Jan-Mar	1.0-2.0	>6.0	---	---	None	---	None
	Apr-Aug	0.0-0.5	>6.0	0.3-1.0	Brief	Occasional	Brief	Occasional
	Sep-Dec	1.0-2.0	>6.0	---	---	None	---	None
Haplosaprists----------	Jan-Mar	0.0	>6.0	0.0-0.3	Long	Frequent	---	None
	Apr-Jul	0.0	>6.0	0.3-1.0	Very long	Frequent	Brief	Occasional
	August	0.0	>6.0	0.3-1.0	Very long	Frequent	---	None
	Sep-Dec	0.0	>6.0	0.0-0.3	Long	Frequent	---	None
111:								
Aquandic Xerofluvents---	Mar-May	2.0-4.0	>6.0	---	---	None	Brief	Occasional
112:								
Aquic Dystrocryepts----	Mar-Jun	1.5-2.8	1.7-5.0	---	---	None	---	None
119:								
Boesel-----------------	January	3.0-4.0	>6.0	---	---	None	---	None
	Feb-May	3.0-4.0	>6.0	---	---	None	Brief	Occasional
	June	3.0-4.0	>6.0	---	---	None	---	None

Table 5.--Water Features--Continued

Map symbol and soil name	Month	Water table		Ponding			Flooding	
		Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
		Ft	*Ft*	*Ft*				
130:								
Cassal	Mar-Jun	3.0-3.7	3.3-5.0	---	---	None	---	None
150:								
Cryofluvents	Mar-Jun	1.7-2.5	>6.0	---	---	Rare	Brief	Occasional
181:								
Histic Cryaquepts	Mar-Aug	0.0	>6.0	0.0-1.0	Long	Frequent	---	None
Cryohemists	Jan-Mar	0.0	>6.0	0.0-1.0	Long	Frequent	---	None
	Apr-Aug	0.0	>6.0	0.0-1.0	Long	Frequent	Brief	Occasional
	Sep-Dec	0.0	>6.0	0.0-1.0	Long	Frequent	---	None
182:								
Hodgson	January	4.0-5.0	>6.0	---	---	None	---	None
	February	2.5-4.0	>6.0	---	---	None	---	None
	March	0.6-2.5	>6.0	---	---	None	---	None
	April	2.5-4.0	>6.0	---	---	None	---	None
	May	4.0-5.0	>6.0	---	---	None	---	None
218:								
Longswamp	Mar-May	2.1-3.3	2.1-3.3	---	---	None	---	None
225:								
Martella	January	3.5-4.5	>6.0	---	---	None	---	None
	February	2.5-3.5	>6.0	---	---	None	---	None
	March	2.0-2.5	>6.0	---	---	None	---	None
	April	2.5-3.5	>6.0	---	---	None	---	None
	May	3.5-4.5	>6.0	---	---	None	---	None
	June	4.5-5.0	>6.0	---	---	None	---	None
	December	4.5-5.0	>6.0	---	---	None	---	None
236:								
Muckamuck	Jan-May	---	---	---	---	None	Brief	Occasional
243:								
Myerscreek	Jan-Dec	---	---	---	---	None	---	None
Aquic Dystrocryepts	Mar-Jun	1.5-2.8	1.7-5.0	---	---	None	---	None
248:								
Myerscreek	Jan-Dec	---	---	---	---	None	---	None
Histic Cryaquepts	Mar-Aug	0.0	>6.0	0.0-1.0	Long	Frequent	---	None
Cryohemists	Jan-Mar	0.0	>6.0	0.0-1.0	Long	Frequent	---	None
	Apr-Aug	0.0	>6.0	0.0-1.0	Long	Frequent	Brief	Occasional
	Sep-Dec	0.0	>6.0	0.0-1.0	Long	Frequent	---	None
314:								
Ret	January	2.5-3.0	>6.0	---	---	None	---	None
	February	1.7-2.5	>6.0	---	---	None	Brief	Occasional
	March	1.2-1.7	>6.0	---	---	None	Brief	Occasional
	April	0.7-1.2	>6.0	---	---	None	Brief	Occasional
	May	1.7-2.5	>6.0	---	---	None	Brief	Occasional
	June	2.5-3.0	>6.0	---	---	None	---	None
	July	3.0-5.0	>6.0	---	---	None	---	None
	December	3.0-5.0	>6.0	---	---	None	---	None

Table 5.--Water Features--Continued

Map symbol and soil name	Month	Water table		Ponding			Flooding	
		Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
		Ft	*Ft*	*Ft*				
315:								
Riverwash	Jan-Jul	0.0-2.0	>6.0	---	---	None	Very long	Frequent
	Aug-Sep	0.0-2.0	>6.0	---	---	None	---	None
	Oct-Dec	0.0-2.0	>6.0	---	---	None	Very long	Frequent
Water.								
361:								
Thrapp	Mar-Jun	2.9-3.7	2.9-3.7	---	---	None	---	Rare
Aquandic Xerofluvents	Mar-May	2.0-4.0	>6.0	---	---	None	Brief	Occasional
366:								
Toats	Jan-Dec	---	---	---	---	None	---	None
Longswamp	Mar-Jun	2.0-3.7	>6.0	---	---	None	---	None
386:								
Vitrandic Eutrocryepts	Apr-May	2.5-4.0	>6.0	---	---	None	---	Rare
	Jun-Jul	2.5-4.0	>6.0	---	---	None	---	None
Cryaquolls	Apr-May	1.7-2.5	>6.0	---	---	Rare	Brief	Occasional
	Jun-Jul	1.7-2.5	>6.0	---	---	Rare	---	None
703:								
Cryaquepts	Mar-Aug	0.0-1.5	>6.0	0.3-1.0	Brief	Occasional	Brief	Occasional
	Sep-Oct	1.5-2.5	>6.0	---	---	None	---	None
Aquic Dystrocryepts	Mar-Jun	1.5-2.8	1.7-5.0	---	---	None	---	None
900:								
Andic Dystrocryepts	Jan-Dec	---	---	---	---	None	---	None
Andic Haplocryods	Jan-Dec	---	---	---	---	None	---	None
Cryofluvents	Mar-Jun	1.0-1.7	>6.0	---	---	Rare	Brief	Occasional

Rangeland and Ecological Sites

Map units and map unit components that have an overstory canopy cover of less than 25 percent are classified as rangeland. Some soil series, such as the Wagberg series, have only grasses for vegetative cover; others, such as the Crocamp series, have grasses and shrubs. Rangeland plant communities are identified by the USDA–Natural Resources Conservation Service as ecological sites. The ecological sites are identified by a name and ecological site number, for example “Loamy 9–15 P.Z. (R008XY102WA).” The ecological site name and number are listed in the detailed soil map unit descriptions under the heading “Interpretive Groups.”

An ecological site is the product of all the environmental factors responsible for its development. It has characteristic soils that developed over time throughout the soil development process; a characteristic hydrology that developed over time, particularly infiltration and runoff; and a characteristic plant community (kind and amount of vegetation). The hydrology of the site is influenced by development of the soil and plant community. The vegetation, soils, and hydrology are all interrelated. Each is influenced by the others, and each influences the development of the others. The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and proportion of species or in total production. Percent composition of individual species in an ecological site is determined by percent dried weight. Descriptions of ecological sites are provided in the electronic Field Office Technical Guide, which is available at http://www.wa.nrcs.usda.gov/ or at the local office of the Natural Resources Conservation Service.

Range management requires knowledge of the kinds of soil and of the historic climax plant community. It also requires an evaluation of the present range similarity index and rangeland trend. Range similarity index is determined by comparing the present plant community with the historic climax plant community on a particular rangeland ecological site. The more closely the existing community resembles the historic community, the higher the range similarity index. Rangeland trend is defined as the direction of change in an existing plant community relative to the historic climax plant community. Further information about the range similarity index and rangeland trend is available in chapter 4 of the “National Range and Pasture Handbook” (USDA, no date).

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the historic climax plant community for that site. Such management generally results in the optimum production of vegetation, control of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, an area with a range similarity index somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Many acres of woodland in the survey area are grazeable by livestock. Most of this land is grazed by cattle or has been grazed by sheep and cattle. Generally, the primary use of the woodland is the production of wood fiber and the secondary use is grazing. The forest understory produces forage for wildlife and livestock. Unlike rangeland that supports dominantly grass plants, the woodland understory consists of dominantly shrubby plants and broadleaf succulent plants as well as young trees.

The impact of forestry activities on the production and composition of woodland understory is greater than the impact of grazing activities. During the early period of settlement, grass production was high, shrubs were sparse, and fast-moving ground fires were common. Heavily barked trees were relatively undamaged by these fires. As practices were implemented to control fires, brush replaced much of the grass and shade-tolerant trees gained a foothold. As the canopy closed, livestock forage decreased dramatically. Typically, the number of livestock was not adjusted to this decrease in forage and overgrazing resulted.

Silvicultural practices, such as harvesting of shelter wood and thinning for commercial production, increase forage production by opening up the canopy. Using managed burns to dispose of slash and controlling plant competition also increase timber and forage production.

Areas of rangeland are intermingled with forested areas. The areas of rangeland produce a majority of the forage in the survey area. Depending on their size, these areas may occur as separate detailed soil map units or in complexes with timbered areas.

Most of the forested soils that are grazed by livestock and wildlife are on south-facing slopes of 0 to 65 percent at elevations of 1,000 to 5,000 feet. Variations in slope, aspect, elevation, climate, and soil throughout the grazeable woodland affect the understory plant community. The time of year when the forage is ready for grazing varies depending on slope aspect and elevation. Generally, forage plants at the lowest elevations have adequate growth for livestock grazing by mid-May and those at the highest elevations are adequate by mid-July.

Plant Community Classification

The map units in the survey area are correlated to forestland and plant associations, riparian and wetland series, plant association groups and zones, or vegetation series and zones.

Most of the survey area is on the eastern slopes of the North Cascades Mountains. The survey area spans a variety of climatic zones. The majority of the area is in the drier rain shadow of the North Cascades. Along the crest of the mountains on the far western edge of the survey area, however, very moist plant communities abound. The eastern edge of the survey area supports a transition to the more maritime plant communities.

Several references were used in correlating plant associations, riparian and wetland series, plant association groups and zones, and vegetation series and zones to soil map unit components. The “Field Guide for Forested Plant Associations of the Wenatchee National Forest” (Lillybridge and others, 1995) was used for map units west of the Okanogan River. The “Forested Plant Associations of the Colville National Forest” (Williams and others, 1995) was used for map units east of the Okanogan River. Where a map unit occurred both east and west of the Okanogan River, a plant association was correlated to the map unit from each guide. The plant association quaking aspen/pinegrass (HQG111) is referenced in “Forested Plant Associations of the Okanogan National Forest” (Williams and Lillybridge, 1983). The “Classification and Management of Aquatic, Riparian, and Wetland Sites on the National Forests of Eastern Washington: Series Descriptions” (Kovalchik and Clausnitzer, 2004) was used for all map unit components in which wetness is a feature. The publication “Pacific Northwest Ecoclass Codes for Seral and Potential Natural Communities” (Hall, 1998) provides a list of codes to identify various vegetation resources in the Pacific Northwest. The codes encompass three parts: potential natural community (PNC), seral status, and vegetation structure. All references to plant associations, plant association groups (subseries), and series codes in Region 6 of the USDA Forest Service are at http://www.reo.gov/ecoshare/codesets/.

The section “How This Survey Was Made” contains a description of soil mapping intensities. Because different orders of soil mapping intensity are used in this survey, different levels of plant system classifications are needed. The levels of plant classification are correlated to the levels of soil mapping intensity. In the areas mapped at order 3 intensity (the most detailed), plant associations are correlated to soil map unit components, primarily soils series. Wetland series are used throughout the survey area and are correlated to soil components at the great group and subgroup levels. In plant associations, a climax series is generally named for the most shade-tolerant tree species that is capable of reproducing in that environment.

As previously mentioned, rangeland map unit components units have an overstory canopy cover of less than 25 percent. Forestland map unit components have an overstory canopy cover of 25 percent or more. In this survey area, however, some of the forestlands are grazed by cattle. The productivity and management sections of the field guides describing plant association for the Wenatchee and Colville National Forests indicate which plant associations are suitable for grazing.

In many instances, all map unit components of a soil series can be correlated to a single plant association. For example, all map unit components of the Rendovy series are correlated to the Douglas-fir/pinegrass (CDG131) plant association. In some instances, however, a soil series is correlated to more than one plant association. Where this occurs, a phase of the soil series is identified. For example, the Myerscreek, cool, phase is correlated to the subalpine fir/grouse blueberry (huckleberry) (CES426) plant association and the Myerscreek, moist, phase is correlated to the subalpine fir/twinflower (CEF222) plant association.

Along the North Cascades Scenic Highway Corridor, a less intense level of mapping detail was needed for management of the soil resources. In this area, the map units are typically identified with map symbols 900 through 927 and the plant association groups or zones are correlated to the map unit components (primarily subgroups). Plant association groups are organized so that similar plant associations are correlated to similar soil temperature and soil moisture regimes.

In the Pasayten and Lake Chelan Sawtooth Wilderness Areas, an even less intense detail of mapping was needed for management. In these areas, the map units are typically identified with map symbols 700 through 714 and the vegetation series or zones are correlated to the map unit components (primarily subgroups).

The plant association, riparian and wetland series, plant association group or zone, or vegetation series or zone that is correlated to each map unit component is listed in the detailed map unit description under the heading “Interpretive Groups.”

Plant Associations (Order 3 Mapping Area)

The three broad climatic and vegetative zones within the order 3 mapping area are ponderosa pine climax, Douglas-fir climax, and subalpine fir climax.

Ponderosa pine climax

The ponderosa pine climax zone is a transition between rangeland soils and the Douglas-fir climax zone. In the ponderosa pine climax zone, the soils typically have a mesic soil temperature regime and a xeric soil moisture regime. The following plant associations are in the zone.

- Ponderosa pine/bluebunch wheatgrass
- Ponderosa pine/bitterbrush/bluebunch wheatgrass
- Ponderosa pine/pinegrass–bluebunch wheatgrass
- Ponderosa pine–Douglas-fir/bluebunch wheatgrass

Douglas-fir climax

The majority of the order 3 mapping area is in the Douglas-fir climax zone. This zone contains a wide variety of soil characteristics and corresponding plant associations. Western larch is a common secondary tree species west of the Okanogan River. In this zone, the soils typically have a frigid soil temperature regime and a xeric soil moisture regime. The following plant associations are in this zone.

- Douglas-fir/bluebunch wheatgrass
- Douglas-fir/bitterbrush/bluebunch wheatgrass
- Douglas-fir/bitterbrush/pinegrass
- Douglas-fir/pinegrass–bluebunch wheatgrass
- Douglas-fir/pinegrass
- Douglas-fir/kinnikinnick (bearberry)/pinegrass

- Douglas-fir/common snowberry
- Douglas-fir/common snowberry/pinegrass
- Douglas-fir/mountain snowberry
- Douglas-fir/pachistima/pinegrass
- Douglas-fir/dwarf huckleberry
- Douglas-fir/low huckleberry
- Douglas-fir/low huckleberry/pinegrass
- Douglas-fir/blue (big) huckleberry
- Douglas-fir/ninebark
- Douglas-fir/ninebark/twinflower
- Quaking aspen/pinegrass

Subalpine fir climax

This climax zone is at higher elevations than the Douglas-fir climax zone. Although prevalent in the order 3 mapping area, the subalpine fir plant associations are dominantly in the order 4 mapping areas. In this zone, the soils typically have a cryic soil temperature regime and either a xeric or udic soil moisture regime. The following plant associations are in this zone.Subalpine fir/dwarf huckleberry

- Subalpine fir/dwarf huckleberry
- Subalpine fir/grouse blueberry (huckleberry)
- Subalpine fir/grouse blueberry (huckleberry)/pinegrass
- Subalpine fir/grouse blueberry (huckleberry)/smooth woodrush
- Subalpine fir/blue (big) huckleberry
- Subalpine fir/pinegrass
- Subalpine fir/pachistima/pinegrass
- Subalpine fir/twinflower
- Subalpine fir/Cascade azalea
- Subalpine fir/Cascade azalea/smooth woodrush
- Whitebark pine/pinegrass
- Whitebark pine/grouse blueberry (huckleberry)/smooth woodrush

Riparian and Wetland Series (Order 3 and 4 Mapping Areas)

The acreage of map units or map unit components for which wetness is a feature is very limited. The following are the series correlated to the soil map unit components for which wetness is a feature. Soil map unit components are typically named at the great group or subgroup level because of the high degree of soil variability. The riparian and wetland series are used in the areas mapped at order 3 and order 4 intensity.

- Douglas-fir/common snowberry, flood plain, riparian; located in the order 3 mapping area
- Quaking aspen/common snowberry, riparian; located in the order 3 mapping area
- Sitka alder series, riparian; located in the North Cascades Scenic Highway Corridor mapping area
- Western redcedar series, wetland; located in the North Cascades Scenic Highway Corridor mapping area
- Farr Willow/saw-leaved (firethread) sedge, wetland; located in the order 3 mapping area
- Engelmann spruce series, wetland; located in the wilderness mapping areas and the order 3 mapping area
- Subalpine fir series, wetland; located in the wilderness mapping areas and the order 3 mapping area
- Willow series, wetland; located in the order 3 mapping area
- Quaking aspen series, wetland; located in the order 3 mapping area

Plant Association Groups or Zones in the North Cascades Scenic Highway Corridor (Order 4 High Intensity Mapping Area)

The North Cascades Scenic Highway Corridor is considered a high intensity, order 4 mapping area. Less intensity of mapping was needed for management of the soil resources. Plant association groups or zones are correlated to map unit components in this area. The following plant association groups and zones are identified.

- Douglas-fir/pinegrass–elk sedge group, Eastern Washington
- Western hemlock/vine maple–Cascade Oregon grape–pachistima group, Eastern Washington (also present in the wilderness areas)
- Subalpine fir/blue (big) huckleberry–twinflower group, Eastern Washington (also present in the wilderness areas)
- Pacific silver fir/rusty menziesia–Cascade azalea–blue (big) huckleberry group, Eastern Washington (also present in the wilderness areas)
- Pacific silver fir/blue (big) huckleberry–dwarf bramble group, Eastern Washington
- Parkland Zone, subalpine fir subseries, Eastern Washington
- Parkland Zone, subalpine larch subseries, Eastern Washington (also present in the wilderness areas)
- Parkland Zone, mountain hemlock subseries, Eastern Washington
- Parkland Zone, whitebark pine subseries, Eastern Washington

Vegetation Series or Zones in the Wilderness Areas (Order 4 Low Intensity Mapping Areas)

The Remote Area Soil Proxy (RASP) modeling system was used to map the Lake Chelan Sawtooth and Pasayten Wilderness Areas. The mapping needed for these areas is less intensive than that needed for the North Cascades Scenic Highway Corridor. The wilderness areas are considered a low intensity order 4 mapping area. Motorized access to the wilderness areas is restricted or prohibited. The following series are identified in the survey area.

- Douglas-fir series, Eastern Washington (also present in the North Cascades Scenic Highway Corridor)
- Western hemlock series, Eastern Washington
- Subalpine fir–Engelmann spruce closed forest series, Eastern Washington
- Pacific silver fir series, Eastern Washington (also present in the North Cascades Scenic Highway Corridor)
- Parkland Zone, undifferentiated subseries, Eastern Washington
- Alpine Zone series, Eastern Washington

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit (USDA–SCS, 1961).

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have slight limitations that restrict their use.

Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, 2e. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w, s,* or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, forestland, wildlife habitat, or recreation.

The capability classification of the soils in this survey area is given in the section “Detailed Soil Map Units” under the heading “Interpretive Groups.”

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1999 and 2003). 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 categories are defined in the following paragraphs.

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

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Xeroll (*Xer*, meaning dry, 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 Haploxerolls (*Hapl*, meaning minimal horizonation, plus *xeroll*, the suborder of the Mollisols that has a xeric moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic 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 Haploxerolls.

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 loamy-skeletal, mixed, superactive, mesic Typic Haploxerolls.

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

The table “Taxonomic Classification of the Soils” indicates the order, suborder, great group, subgroup, and family of the soil series in the survey area.

Table 6.--Taxonomic Classification of the Soils

[An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics that are outside the range of the series]

Soil name	Family or higher taxonomic class
Aits	Coarse-loamy, isotic, frigid Andic Haploxerepts
Andic Dystrocryepts	Andic Dystrocryepts
Andic Dystrudepts	Andic Dystrudepts
Andic Eutrocryepts	Andic Eutrocryepts
Andic Haplocryods	Andic Haplocryods
Andic Haploxerepts	Andic Haploxerepts
Anglen	Fine, isotic, frigid Andic Palexeralfs
Aquandic Cryaquepts	Aquandic Cryaquepts
Aquandic Endoaquolls	Aquandic Endoaquolls
Aquandic Xerofluvents	Aquandic Xerofluvents
Aquic Dystrocryepts	Aquic Dystrocryepts
Ashnola	Ashy over loamy-skeletal, amorphic over isotic Typic Vitricryands
Baldknob	Loamy-skeletal, mixed, superactive, frigid Lithic Ultic Haploxerolls
Bamber	Ashy-skeletal, glassy Xeric Vitricryands
Banker	Loamy-skeletal, isotic Lithic Eutrocryepts
Bearspring	Loamy-skeletal, isotic, frigid Vitrandic Haploxerolls
Bluebuck	Sandy-skeletal, isotic Vitrandic Eutrocryepts
Boesel	Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Cumulic Haploxerolls
Bong	Sandy, mixed, mesic Vitrandic Haploxerolls
Borgeau	Loamy-skeletal, isotic, mesic Vitrandic Haploxerolls
Brevco	Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts
Bromas	Sandy-skeletal, isotic Andic Eutrocryepts
Burget	Loamy, mixed, superactive, shallow Vitrandic Dystrocryepts
Burpeak	Ashy-skeletal over loamy-skeletal, glassy over isotic Xeric Vitricryands
Buttoncreek	Loamy-skeletal, isotic Andic Eutrocryepts
Cassal	Loamy-skeletal, isotic, frigid Vitrandic Haploxerolls
Chewack	Ashy-skeletal over loamy-skeletal, glassy over isotic Xeric Vitricryands
Chumstick	Loamy-skeletal, isotic, frigid Lithic Ultic Haploxerolls
Conconully	Coarse-loamy, mixed, superactive, mesic Vitrandic Haploxerolls
Coopmont	Ashy over loamy-skeletal, glassy over isotic Xeric Vitricryands
Coxit	Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts
Crocamp	Loamy-skeletal, mixed, superactive Vitrandic Dystrocryepts
Cryaquepts	Cryaquepts
Cryaquolls	Cryaquolls
Cryofluvents	Cryofluvents
Cryohemists	Cryohemists
Cubhill	Loamy-skeletal, mixed, superactive, mesic Vitrandic Argixerolls
Devore	Loamy-skeletal, isotic Andic Eutrocryepts
Dodd	Sandy-skeletal, isotic Lithic Cryorthents
Doe	Ashy-skeletal, glassy, frigid Typic Vitrixerands
Donavan	Coarse-loamy, isotic, mesic Vitrandic Haploxerolls
Edds	Ashy over loamy, glassy over isotic Humic Xeric Vitricryands
Enson	Coarse-loamy, isotic, frigid Vitrandic Haploxerepts
Farway	Ashy over loamy-skeletal, glassy over isotic, frigid Typic Vitrixerands
Fears	Ashy-skeletal, glassy Xeric Vitricryands
Finney	Loamy-skeletal, isotic Andic Eutrocryepts
Foggydew	Loamy-skeletal, mixed, superactive, mesic Vitrandic Haploxerolls
Fulvicryands	Fulvicryands
Gahee	Ashy over loamy, glassy over isotic Xeric Vitricryands
Gatewall	Loamy-skeletal, isotic Andic Eutrocryepts
Goddard	Sandy-skeletal, isotic, frigid Andic Haploxerepts
Goshawk	Loamy-skeletal, isotic, frigid Andic Haploxeralfs
Granflat	Sandy-skeletal, isotic, frigid Vitrandic Haploxerolls
Growden	Loamy-skeletal, isotic Andic Dystrocryepts
Haplosaprists	Haplosaprists
Histic Cryaquepts	Histic Cryaquepts
*Hodgson	Fine-loamy, mixed, superactive, mesic Vitrandic Palexeralfs
Humic Dystrocryepts	Humic Dystrocryepts
Humic Vitricryands	Humic Vitricryands

Table 6.--Taxonomic Classification of the Soils--Continued

Soil name	Family or higher taxonomic class
Inkler	Loamy-skeletal, isotic, frigid Andic Haploxerepts
Jantill	Sandy-skeletal, isotic Andic Dystrocryepts
Jimbluff	Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts
Johntom	Loamy-skeletal, mixed, superactive, mesic Lithic Haploxerolls
Kartar	Coarse-loamy, isotic, mesic Vitrandic Haploxerepts
Karu	Loamy-skeletal, isotic Vitrandic Eutrocryepts
*Koepke	Coarse-loamy, isotic, frigid Vitrandic Haploxerolls
Lani	Coarse-loamy, isotic, frigid Vitrandic Haploxerolls
Leftcreek	Ashy-skeletal, glassy, mesic Lithic Vitrixerands
Leiko	Sandy-skeletal, mixed, mesic Vitrandic Haploxerolls
Lekrem	Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts
Leonardo	Ashy over loamy-skeletal, glassy over isotic Humic Xeric Vitricryands
Limking	Ashy over sandy or sandy-skeletal, glassy over isotic, frigid Typic Vitrixerands
Lithic Dystrocryepts	Lithic Dystrocryepts
Lithic Eutrocryepts	Lithic Eutrocryepts
Lithic Haploxerepts	Lithic Haploxerepts
Lithic Ultic Haploxerolls	Lithic Ultic Haploxerolls
Lithic Vitricryands	Lithic Vitricryands
Longort	Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts
Longswamp	Fine-loamy, isotic Vitrandic Haplocryolls
*Longswamp	Coarse-loamy, isotic, frigid Vitrandic Haploxerolls
Loupoup	Ashy over loamy, glassy over isotic, frigid Typic Vitrixerands
Manley	Ashy over loamy-skeletal, glassy over isotic Xeric Vitricryands
Martella	Fine-silty, isotic, frigid Andic Haploxeralfs
McCay	Loamy-skeletal, isotic Andic Dystrocryepts
Merkel	Loamy-skeletal, isotic, frigid Vitrandic Dystroxerepts
*Merkel	Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts
Midpeak	Loamy-skeletal, isotic, frigid Vitrandic Haploxerolls
Mineral	Loamy-skeletal, isotic, frigid Vitrandic Haploxerolls
Molson	Ashy over loamy, glassy over mixed, superactive, frigid Humic Vitrixerands
Muckamuck	Fine-loamy, mixed, superactive, frigid Fluventic Haploxerolls
Myerscreek	Loamy-skeletal, isotic Andic Eutrocryepts
Nahahum	Fine-loamy, isotic, frigid Vitrandic Haploxeralfs
Nanamkin	Sandy-skeletal, isotic, frigid Typic Xerorthents
Nevine	Ashy over loamy-skeletal, glassy over isotic, frigid Typic Vitrixerands
Newbon	Coarse-loamy, mixed, superactive, mesic Typic Haploxerolls
Newhorn	Loamy-skeletal, isotic, frigid Andic Haploxerepts
Nicmar	Loamy-skeletal, isotic, frigid Vitrandic Palexeralfs
Ontrail	Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts
Ortellcreek	Loamy-skeletal, isotic Andic Glossocryalfs
Oxerine	Loamy-skeletal, isotic, frigid Andic Haploxerepts
Parmenter	Ashy over sandy or sandy-skeletal, glassy over isotic, frigid Typic Vitrixerands
Pebcreek	Sandy-skeletal, isotic, frigid Vitrandic Haploxerepts
Peka	Loamy-skeletal, mixed, superactive, mesic Vitrandic Haploxerolls
Pelican	Loamy-skeletal, mixed, superactive, frigid Vitrandic Haploxerolls
Pepoon	Ashy-skeletal, glassy, frigid Lithic Vitrixerands
Pettijohn	Ashy-skeletal, glassy, frigid Typic Vitrixerands
Radercreek	Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts
Redpeak	Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts
Remmel	Loamy-skeletal, isotic Andic Eutrocryepts
Rendovy	Loamy-skeletal, isotic, frigid Andic Palexeralfs
Republic	Coarse-loamy, isotic, frigid Vitrandic Haploxerolls
Resner	Ashy over sandy or sandy-skeletal, glassy over isotic Xeric Vitricryands
Ret	Coarse-loamy, isotic, frigid Cumulic Haploxerolls
Rufus	Loamy-skeletal, isotic, mesic Lithic Ultic Haploxerolls
Sacheen	Mixed, frigid Typic Xeropsamments
Salcreek	Fine-loamy, isotic, frigid Vitrandic Argixerolls
Santop	Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts
Scheiner	Sandy, isotic Vitrandic Eutrocryepts
Scoap	Loamy-skeletal, isotic, frigid Vitrandic Haploxerolls
Setill	Loamy-skeletal, isotic, mesic Vitrandic Argixerolls
Shalrock	Loamy-skeletal, isotic, frigid Vitrandic Haploxerolls

Table 6.--Taxonomic Classification of the Soils--Continued

Soil name	Family or higher taxonomic class
Shermount	Loamy-skeletal, mixed, superactive Humic Lithic Dystrocryepts
Sitdown	Sandy-skeletal, isotic Andic Eutrocryepts
Smokejump	Loamy-skeletal, isotic Andic Dystrocryepts
Springdale	Sandy-skeletal, isotic, mesic Vitrandic Haploxerepts
Stapaloop	Coarse-loamy, isotic, frigid Vitrandic Haploxerepts
Stemilt	Loamy-skeletal, isotic, frigid Vitrandic Argixerolls
Stepstone	Ashy over sandy or sandy-skeletal, glassy over isotic, frigid Typic Vitrixerands
Storer	Loamy-skeletal, mixed, superactive, mesic Typic Haploxerolls
Surgh	Loamy-skeletal, isotic Andic Eutrocryepts
Swakane	Loamy-skeletal, mixed, superactive, mesic Lithic Ultic Haploxerolls
Sycreek	Loamy-skeletal, isotic, frigid Vitrandic Argixerolls
Thout	Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts
Thow	Ashy, glassy, frigid Typic Vitrixerands
Thowson	Ashy, glassy, mesic Typic Vitrixerands
Thrapp	Coarse-loamy, isotic, frigid Vitrandic Haploxerolls
Thuso	Loamy-skeletal, mixed, superactive, mesic Vitrandic Haploxerolls
Toats	Loamy-skeletal, mixed, superactive Vitrandic Dystrocryepts
Togo	Ashy over loamy-skeletal, glassy over isotic Xeric Vitricryands
Torboy	Sandy, isotic, frigid Vitrandic Haploxerepts
Treebutte	Loamy-skeletal, isotic Lithic Eutrocryepts
Twentymile	Loamy-skeletal, isotic Andic Dystrocryepts
Typic Udivitrands	Typic Udivitrands
Typic Vitricryands	Typic Vitricryands
Typic Vitrixerands	Typic Vitrixerands
Vallan	Loamy, mixed, superactive, frigid Lithic Haploxerepts
Vanbrunt	Loamy-skeletal, isotic, mesic Vitrandic Haploxerolls
Venson	Loamy-skeletal, isotic Andic Dystrocryepts
Verhart	Loamy-skeletal, isotic Vitrandic Eutrocryepts
Veridge	Loamy-skeletal, isotic, frigid Andic Haploxerepts
Vinegar	Ashy, glassy, frigid Typic Vitrixerands
Vingulch	Ashy over loamy-skeletal, glassy over isotic, frigid Typic Vitrixerands
Vitrandic Dystrocryepts	Vitrandic Dystrocryepts
Vitrandic Dystrudepts	Vitrandic Dystrudepts
Vitrandic Eutrocryepts	Vitrandic Eutrocryepts
Vitrandic Haploxerepts	Vitrandic Haploxerepts
Volmont	Loamy-skeletal, isotic Vitrandic Eutrocryepts
Wagberg	Loamy-skeletal, mixed, superactive, mesic Vitrandic Haploxerolls
Wapal	Sandy-skeletal, isotic, frigid Vitrandic Haploxerepts
Wellie	Sandy-skeletal, isotic, frigid Typic Xerorthents
Wellsfar	Loamy-skeletal, isotic Vitrandic Eutrocryepts
Wenner	Fine-loamy, mixed, superactive, mesic Vitrandic Argixerolls
Wilder	Sandy, isotic, frigid Vitrandic Haploxerolls
Wilma	Loamy-skeletal, isotic, frigid Andic Haploxerepts
Winsand	Loamy-skeletal, isotic Vitrandic Eutrocryepts
Winthrop	Sandy-skeletal, mixed, mesic Entic Ultic Haploxerolls
Wocreek	Ashy, glassy Xeric Vitricryands
Wynhoff	Loamy-skeletal, mixed, superactive, mesic Typic Haploxerolls
Xeric Vitricryands	Xeric Vitricryands
Yellcreek	Loamy-skeletal, isotic, frigid Vitrandic Haploxerolls

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each 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) and in the “Field Book for Describing and Sampling Soils” (Schoeneberger and others, 2002). Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” (Soil Survey Staff, 1999) and in “Keys to Soil Taxonomy” (Soil Survey Staff, 2003). Unless otherwise indicated, colors in the descriptions are for dry soil and textures are apparent field textures. Following the pedon description is the range of important characteristics of the soils in the series.

Aits Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains and foothills
Position on landscape: Backslopes and footslopes
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 15 to 35 percent
Elevation: 2,500 to 4,000 feet
Mean annual precipitation: 22 to 35 inches
Mean annual air temperature: 41 to 43 degrees F
Frost-free period: 90 to 110 days
Taxonomic classification: Coarse-loamy, isotic, frigid Andic Haploxerepts

Typical Pedon

Aits ashy loam; Stevens County, Washington; on a road cut uphill from a logging road; 1,460 feet east and 2,400 feet south of northwest corner of sec. 26, T. 40 N., R. 37 E.; latitude 48 degrees 56 minutes 17 seconds north and longitude 118 degrees 4 minutes 38 seconds west.

Oi—1 inch to 0; slightly decomposed mat of leaves, twigs, needles, and roots.
A—0 to 2 inches; brown (10YR 5/3) ashy loam, dark brown (10YR 4/2) moist; weak fine granular structure; soft, friable, nonsticky and nonplastic; weakly smeary; many fine roots; many fine pores; 5 percent stones; slightly acid; abrupt smooth boundary.
Bw1—2 to 12 inches; brown (7.5YR 5/4) ashy loam, dark brown (7.5YR 3/3) moist; weak fine and medium subangular blocky and moderate medium and coarse granular structure; soft, friable, nonsticky and slightly plastic; weakly smeary; many fine roots; many fine pores; 5 percent stones; slightly acid; clear wavy boundary.
2Bw2—12 to 17 inches; light gray (10YR 7/2) gravelly loam, light olive brown (2.5Y 5/4) moist; moderate medium and coarse subangular structure; hard, firm, slightly sticky and slightly plastic; many fine roots; many fine pores; 15 percent gravel; slightly acid; gradual wavy boundary.
2Bw3—17 to 34 inches; grayish brown (10YR 5/2) gravelly loam, dark grayish brown (2.5Y 4/2) moist; few pockets and lenses of brown (10YR 4/3, moist) clay loam; moderate medium and fine subangular blocky structure; hard, firm, slightly sticky and slightly plastic; many fine roots; many fine pores; 25 percent angular pebbles; neutral; gradual wavy boundary.
2Bw4—34 to 45 inches; light gray (2.5Y 7/2) gravelly loam, grayish brown (2.5Y 5/2) moist; moderate medium and coarse angular blocky structure; hard, firm, slightly

sticky and slightly plastic; many fine pores; 25 percent angular pebbles; slightly acid; gradual wavy boundary.

2Bw5—45 to 60 inches; pale olive (5Y 6/3) very gravelly clay loam, olive (5Y 4/3) moist; coatings of light olive brown (2.5Y 5/4, moist) on faces of peds; moderate medium and coarse angular blocky structure; very hard, firm, moderately sticky and moderately plastic; many clay films on faces of peds; 50 percent angular pebbles; slightly acid.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 5 to 35 percent

A horizon:
Value—3 to 7 dry, 3 to 5 moist
Chroma—1 to 4 dry or moist

Bw horizon:
Hue—7.5YR or 10YR
Value—4 to 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Texture—ashy loam or ashy very fine sandy loam
Content of rocks—5 to 25 percent

2Bw horizon:
Hue—2.5Y, 5Y, or 10YR
Value—5 to 7 dry, 4 or 5 moist
Chroma—2 to 4 dry or moist
Texture—loam, and, below a depth of 40 inches, clay loam, sandy clay loam, or the gravelly analogs of those textures
Content of rocks—5 to 35 percent to a depth of 40 inches; 15 to 60 percent below 40 inches

Andic Dystrocryepts

Soil depth: Moderately deep to very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, shoulders, and ridges of mountains; and backslopes and footslopes of glacial-trough valleys of mountains
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 15 to 90 percent
Elevation: 3,400 to 7,800 feet
Mean annual precipitation: 35 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 90 days
Taxonomic classification: Andic Dystrocryepts

Reference Pedon

Andic Dystrocryepts, in an area of Andic Dystrocryepts-Aquic Dystrocryepts complex, 0 to 35 percent slopes; Okanogan National Forest Area, Washington; about 5 miles west of Wauconda, Washington; 2,200 feet east and 2,000 feet south of the northwest corner of sec. 2, T. 38 N., R. 29 E.; latitude 48 degrees 49 minutes 24 seconds north and longitude 119 degrees 7 minutes 32 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, moss, twigs, and grass.

C—0 to 1 inch; light gray (10YR 7/2) ashy silt loam (recent volcanic ash), light brownish gray (10YR 6/2) moist; weak fine granular structure; soft, very friable,

nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium roots; few fine pores; moderately acid; abrupt smooth boundary.

2A—1 to 4 inches; pale brown (10YR 6/3) ashy fine sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium roots; common fine pores; moderately acid; clear wavy boundary.

2Bw—4 to 10 inches; light yellowish brown (10YR 6/4) ashy fine sandy loam, dark brown (10YR 4/6) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common coarse roots; few fine pores; 5 percent gravel; moderately acid; clear wavy boundary.

3C1—10 to 21 inches; grayish brown (10YR 5/2) cobbly sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; few very fine pores; 10 percent gravel and 15 percent cobbles; slightly acid; gradual wavy boundary.

3C2—21 to 60 inches; light brownish gray (10YR 6/2) gravelly loamy sand, grayish brown (10YR 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; few fine pores; 20 percent gravel and 10 percent cobbles; slightly acid.

Range in Characteristics

Depth to bedrock: 20 to more than 60 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches
Rock fragments: 15 to 75 percent
Soil moisture regime: Udic
Note: Not all pedons have a C horizon.

C horizon (where present):
Content of gravel—0 to 20 percent
Content of cobbles—0 to 25 percent
Content of stones—0 to 20 percent

2A horizon:
Hue—7.5YR or 10YR
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 to 6 dry or moist
Texture of the fine-earth fraction—ashy fine sandy loam or ashy sandy loam
Content of gravel—0 to 20 percent
Content of cobbles—0 to 25 percent
Content of stones—0 to 20 percent

2Bw horizon:
Hue—7.5YR or 10YR
Value—4 to 6 dry, 3 to 5 moist
Chroma—2 to 6 dry or moist
Texture of the fine-earth fraction—ashy fine sandy loam or ashy sandy loam
Content of gravel—5 to 25 percent
Content of cobbles—0 to 30 percent
Content of stones—0 to 15 percent

3C horizon:
Hue—2.5Y or 10YR
Value—5 or 6 dry, 2 to 5 moist
Chroma—2 or 3 dry or moist
Texture of the fine-earth fraction—loamy sand, fine sandy loam, or sandy loam
Content of gravel—10 to 30 percent
Content of cobbles—5 to 35 percent
Content of stones—0 to 20 percent

Andic Dystrudepts

Soil depth: Moderately deep to very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and shoulders of glacial-trough valleys
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 35 to 90 percent
Elevation: 2,100 to 5,000 feet
Mean annual precipitation: 50 to 70 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 85 to 120 days
Taxonomic classification: Andic Dystrudepts

Reference Pedon

Andic Dystrudepts, in an area of Typic Udivitrands-Andic Dystrudepts association, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 7 miles south-southeast of Crater Mountain; 100 feet east and 1,600 feet south of the northwest corner of sec. 3, T. 36 N., R. 16 E.; latitude 48 degrees 39 minutes 16 seconds north and longitude 120 degrees 50 minutes 35 seconds west.

Oe—3 inches to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.
A—0 to 5 inches; light yellowish brown (10YR 6/4) gravelly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium and coarse roots; few very fine irregular pores; 15 percent gravel; moderately acid; clear wavy boundary.
Bw—5 to 12 inches; brownish yellow (10YR 6/6) gravelly ashy sandy loam, dark yellowish brown (10YR 4/6) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium and coarse roots; few fine irregular pores; 20 percent gravel; moderately acid; clear wavy boundary.
2BC—12 to 22 inches; yellowish brown (10YR 5/4) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; few fine irregular pores; 30 percent gravel, 10 percent cobbles, and 5 percent stones; moderately acid; gradual wavy boundary.
2C—22 to 48 inches; light yellowish brown (2.5Y 6/3) extremely gravelly sandy loam, brown (10YR 5/3) moist; massive; soft, friable, nonsticky and nonplastic; common very fine and fine and few medium roots; 45 percent gravel, 10 percent cobbles, and 10 percent stones; moderately acid; gradual wavy boundary.
2R—48 inches; granodiorite.

Range in Characteristics

Depth to bedrock or densic material: 20 to more than 60 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 25 to 70 percent

A horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Content of gravel—15 to 35 percent

Bw horizon:
Value—4 or 5 moist

Chroma—4 to 6 dry or moist
Texture—gravelly or very gravelly ashy sandy loam
Content of gravel—20 to 40 percent
Content of cobbles—0 to 10 percent

2BC horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—very gravelly, gravelly, or cobbly sandy loam
Content of gravel—25 to 50 percent
Content of cobbles—5 to 15 percent
Content of stones—0 to 10 percent

2C horizon:
Hue—10YR or 2.5Y
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—extremely gravelly, cobbly, or very stony sandy loam
Content of gravel—25 to 50 percent
Content of cobbles—5 to 20 percent
Content of stones—0 to 25 percent

Andic Eutrocryepts

Soil depth: Moderately deep to very deep
Drainage class: Well drained or somewhat excessively drained
Landscape: Mountains
Position on landscape: Backslopes, shoulders, and ridges of mountains; and backslopes and footslopes of glacial-trough valleys
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, and residuum
Slope: 5 to 75 percent
Elevation: 3,900 to 6,160 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Andic Eutrocryepts

Reference Pedon

Andic Eutrocryepts, in an area of Andic Eutrocryepts-Cryaquolls complex, 0 to 35 percent slopes; Okanogan National Forest Area, Washington; about 5 miles west of Wauconda, Washington; 2,200 feet east and 2,000 feet south of the northwest corner of sec. 1, T. 37 N., R. 29 E.; latitude 48 degrees 44 minutes 6 seconds north and longitude 119 degrees 6 minutes 42 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, moss, twigs, and grass.
C—0 to 1 inch; light gray (10YR 7/2) ashy silt loam (recent volcanic ash), light brownish gray (10YR 6/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium roots; few fine pores; moderately acid; abrupt smooth boundary.
2A—1 to 4 inches; pale brown (10YR 6/3) ashy fine sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium and coarse roots; common fine pores; moderately acid; clear wavy boundary.
2Bw1—4 to 10 inches; light yellowish brown (10YR 6/4) ashy fine sandy loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common

medium and coarse roots; few fine pores; 5 percent gravel; moderately acid; clear wavy boundary.
3C1—10 to 21 inches; grayish brown (10YR 5/2) cobbly sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; common very fine and fine and few medium roots; few fine pores; 10 percent gravel and 15 percent cobbles; slightly acid; gradual wavy boundary.
3C2—21 to 60 inches; light brownish gray (10YR 6/2) gravelly loamy sand, grayish brown (10YR 5/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine pores; 20 percent gravel and 10 percent cobbles; slightly acid.

Range in Characteristics

Depth to bedrock or densic material: 20 to more than 60 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 15 to 75 percent
Soil moisture regime: Xeric
Note: Not all pedons have an O horizon; not all pedons have a C horizon.

C horizon:
Content of gravel—0 to 20 percent
Content of cobbles—0 to 25 percent
Content of stones—0 to 20 percent

A or 2A horizon:
Hue—7.5YR or 10YR
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 to 6 dry or moist
Texture—ashy fine sandy loam, very cobbly ashy fine sandy loam, or very gravelly ashy sandy loam
Content of gravel—0 to 20 percent
Content of cobbles—0 to 25 percent
Content of stones—0 to 20 percent

2Bw horizon:
Hue—7.5YR or 10YR
Value—4 to 6 dry, 3 to 5 moist
Chroma—2 to 6 dry or moist
Texture—ashy sandy loam or ashy fine sandy loam or the cobbly, very cobbly, very gravelly, or stony analogs of those textures
Content of gravel—5 to 25 percent
Content of cobbles—0 to 30 percent
Content of stones—0 to 15 percent

3C horizon:
Hue—2.5Y or 10YR
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—gravelly, very gravelly, cobbly, very cobbly, or very stony loamy sand, sandy loam, or fine sandy loam
Content of gravel—10 to 30 percent
Content of cobbles—5 to 35 percent
Content of stones—0 to 20 percent

Andic Haplocryods

Soil depth: Moderately deep to very deep
Drainage class: Well drained or somewhat excessively drained

Landscape: Mountains
Position on landscape: Backslopes, shoulders, and ridges of mountains; and footslopes of glacial-trough valleys
Parent material: Volcanic ash (7 to 14 inches) over residuum, colluvium, and glacial till
Slope: 5 to 90 percent
Elevation: 3,400 to 8,000 feet
Mean annual precipitation: 40 to 90 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 90 days
Taxonomic classification: Andic Haplocryods

Reference Pedon

Andic Haplocryods (fig. 6), in an area of Andic Haplocryods-Typic Vitricryands association, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 0.25 mile east of Rainy Pass; 400 feet east and 1,000 feet north of the southwest corner of sec. 22, T. 35 N., R. 17 E.; latitude 48 degrees 30 minutes 54 seconds north and longitude 120 degrees 43 minutes 46 seconds west.

Oe—3 inches to 0; moderately decomposed mat of needles, twigs, and leaves; abrupt smooth boundary.
E—0 to 2 inches; light brownish gray (10YR 6/2) ashy fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine roots; few very fine tubular pores; strongly acid; abrupt smooth boundary.
Bs1—2 to 10 inches; brown (7.5YR 4/4) ashy sandy loam, dark brown (7.5YR 3/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; strongly smeary; many very fine and fine, common medium, and few coarse roots; few very fine irregular pores; 10 percent gravel; strongly acid; abrupt smooth boundary.
Bs2—10 to 13 inches; yellowish brown (10YR 5/4) gravelly ashy sandy loam, dark brown (7.5YR 3/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; strongly smeary; common very fine and fine and few coarse roots; few very fine irregular pores; 20 percent gravel; strongly acid; clear smooth boundary.
2BC—13 to 22 inches; yellowish brown (10YR 5/4) very gravelly sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; few very fine irregular pores; 30 percent gravel, 10 percent cobbles, and 2 percent stones; strongly acid; gradual wavy boundary.
2C—22 to 34 inches; pale brown (10YR 6/3) extremely cobbly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine pores; 30 percent gravel, 30 percent cobbles, and 5 percent stones; strongly acid; gradual wavy boundary.
2R—34 inches; granite.

Range in Characteristics

Depth to bedrock or densic material: 20 to more than 60 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 20 to 65 percent
Reaction: Very strongly acid to moderately acid

E horizon:
Hue—10YR or 7.5YR
Value—5 to 8 dry, 3 to 6 moist
Chroma—1 to 3 dry or moist
Content of gravel—0 to 10 percent

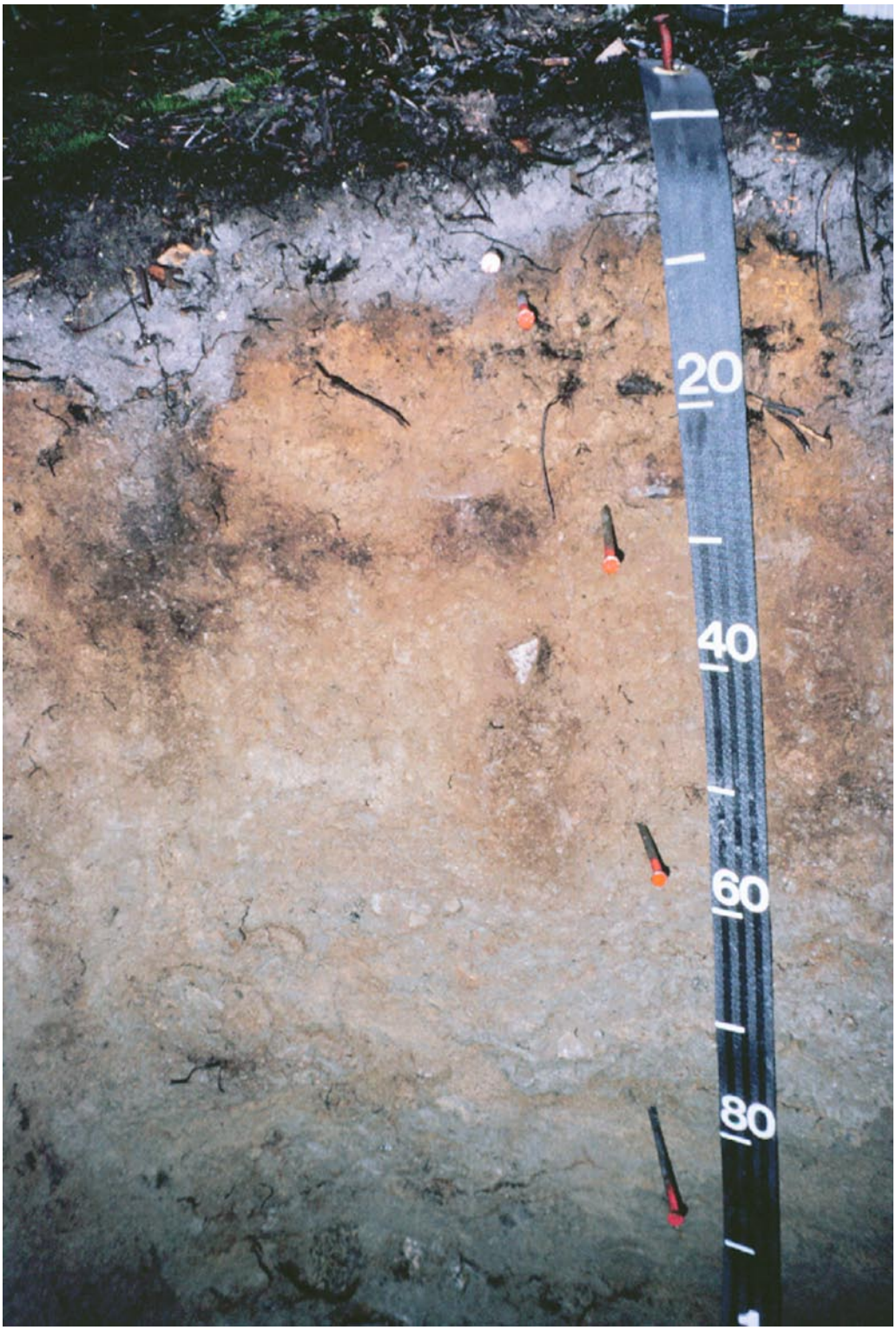

Figure 6.—Profile of Andic Haplocryods, till substratum. The soil has a light-colored albic horizon above a darker-colored spodic horizon over gray glacial till. The glacial till is at a depth of about 55 centimeters (22 inches). Densic contact is at a depth of about 80 centimeters (31 inches). Scale is in centimeters.

Bs horizon:
Hue—7.5YR, 10YR, or 5YR
Value—4 or 5 dry, 3 or 4 moist
Chroma—2 to 4 dry or moist
Texture—gravelly ashy sandy loam, very gravelly ashy sandy loam, ashy sandy loam, or ashy fine sandy loam
Content of gravel—10 to 35 percent
Content of cobbles—0 to 5 percent

2BC horizon:
Hue—10YR, 7.5YR, or 2.5Y
Value—5 to 7 dry, 3 to 5 moist
Chroma—3 to 6 dry or moist
Texture—very gravelly, gravelly, or very cobbly sandy loam
Content of gravel—15 to 45 percent
Content of cobbles—5 to 20 percent
Content of stones—0 to 5 percent

2C horizon:
Hue—10YR, 7.5YR, or 2.5Y
Value—4 to 7 dry, 3 to 6 moist
Chroma—2 to 4 dry or moist
Texture—very gravelly sandy loam, extremely cobbly sandy loam, or very gravelly coarse sandy loam
Content of gravel—20 to 45 percent
Content of cobbles—10 to 30 percent
Content of stones—0 to 5 percent

Andic Haploxerepts

Soil depth: Moderately deep to very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and shoulders
Parent material: Volcanic ash (7 to 14 inches) over glacial till, colluvium, or residuum
Slope: 35 to 75 percent
Elevation: 2,900 to 5,000 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 85 to 120 days
Taxonomic classification: Andic Haploxerepts

Reference Pedon

Andic Haploxerepts, in an area of Typic Vitrixerands-Andic Haploxerepts-Rock outcrop association, 35 to 75 percent slopes; Okanogan National Forest Area, Washington; about 4 miles west of Mazama, Washington; 2,400 feet east and 2,300 feet north of the southwest corner of sec. 33, T. 36 N., R. 19 E.; latitude 48 degrees 34 minutes 41 seconds north and longitude 120 degrees 28 minutes 48 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.
A—0 to 4 inches; brown (10YR 5/3) gravelly ashy sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; moderately smeary; many very fine and fine and few medium and coarse roots;

common very fine and fine pores; 15 percent gravel; neutral; clear smooth boundary.

Bw1—4 to 13 inches; light yellowish brown (10YR 6/4) gravelly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; moderately smeary; many very fine and fine and few medium and coarse roots; common very fine and fine pores; 20 percent gravel and 3 percent cobbles; neutral; clear wavy boundary.

2Bw2—13 to 28 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, grayish brown (10YR 5/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common very fine and fine pores; 30 percent gravel and 5 percent cobbles; neutral; gradual wavy boundary.

2C1—28 to 36 inches; very pale brown (10YR 7/3) very gravelly sandy loam, brown (10YR 5/3) moist; massive; hard, very friable, nonsticky and slightly plastic; few very fine roots; common very fine and fine pores; 40 percent gravel and 5 percent cobbles; neutral; gradual wavy boundary.

2C2—36 to 60 inches; very pale brown (10YR 7/3) very gravelly sandy loam, brown (10YR 5/3) moist; massive; hard, very friable, slightly sticky and slightly plastic; few very fine roots; few very fine and fine pores; 50 percent gravel and 5 percent cobbles; neutral.

Range in Characteristics

Depth to bedrock or densic material: 20 to more than 60 inches

Thickness of the material influenced by volcanic ash: 7 to 14 inches

Content of rock fragments in the particle-size control section: 20 to 65 percent

Note: Some pedons have a C horizon directly below the organic layer. The C horizon consists of white, 140 to 190 year old “T” or 450 to 500 year old “W” ash from Mount Saint Helens.

A horizon:

Value—3 or 4 moist
Chroma—2 or 3 dry or moist
Content of gravel—15 to 20 percent

Bw1 horizon:

Chroma—3 or 4 dry or moist
Texture—ashy sandy loam, gravelly ashy sandy loam, or very gravelly ashy sandy loam
Content of gravel—5 to 35 percent
Content of cobbles—0 to 5 percent

2Bw2 horizon:

Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—gravelly or very gravelly sandy loam
Content of gravel—15 to 40 percent
Content of cobbles—0 to 5 percent

2C horizon:

Value—5 to 7 dry, 4 to 6 moist
Chroma—2 to 4 dry or moist
Texture—very gravelly sandy loam, gravelly sandy loam, or very cobbly sandy loam
Content of gravel—25 to 50 percent
Content of cobbles—0 to 10 percent

Anglen Series

Soil depth: Very deep
Drainage class: Moderately well drained
Landscape: Foothills and mountains
Position on landscape: Glacial lake terraces and terrace escarpments
Parent material: Volcanic ash (7 to 14 inches) over glacial lake sediments
Slope: 0 to 65 percent
Elevation: 2,600 to 4,000 feet
Mean annual precipitation: 17 to 30 inches
Mean annual air temperature: 41 to 43 degrees F
Frost-free period: 90 to 130 days
Taxonomic classification: Fine, isotic, frigid Andic Palexeralfs

Typical Pedon

Anglen ashy loam; North Ferry County Area, Washington; directly west above Canyon Creek Road, in Coville National Forest; NE$^{1}/_{4}$NW$^{1}/_{4}$ sec. 2, T. 35 N., R. 36 E.; latitude 48 degrees 33 minutes 53 seconds north and longitude 118 degrees 15 minutes 10 seconds west.

Oe—1 inch to 0; moderately decomposed mat of fine roots, leaves, twigs, and needles.

Bw—0 to 6 inches; very pale brown (10YR 7/4) ashy loam, dark yellowish brown (10YR 4/4) moist; very weak fine granular structure; loose, very friable, nonsticky and nonplastic; many fine roots; neutral; clear smooth boundary.

C—6 to 14 inches; white (2.5Y 8/2) ashy silt loam, light brownish gray (2.5Y 6/2) moist; massive; slightly sticky and nonplastic; few fine and medium roots; slightly acid; clear smooth boundary.

2Bt1—14 to 29 inches; light brownish gray (2.5Y 6/2) silty clay, grayish brown (2.5Y 5/2) moist; exteriors of peds are white (2.5Y 8/2) dry and light brownish gray (2.5Y 6/2) moist; moderate medium and fine prismatic structure; hard, very firm, sticky and plastic; fine and medium roots; common faint continuous clay films on ped faces and in pores; moderately acid; clear smooth boundary.

2Bt2—29 to 43 inches; pale brown (10YR 6/3) silty clay, brown (10YR 5/3) moist; exteriors of peds are white (10YR 8/1) dry and gray (10YR 6/1) moist; moderate medium subangular blocky structure; hard, firm, sticky and slightly plastic; common fine roots; common faint discontinuous clay films in pores; few pebbles; slightly acid; few small sand pockets; clear smooth boundary.

2C1—43 to 52 inches; light gray (10YR 7/1) silt loam, gray (10YR 6/1) moist; few irregular pale brown (10YR 6/3) clay bands, brown (10YR 5/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few roots; slightly acid; clear smooth boundary.

2C2—52 to 60 inches; light gray (10YR 7/1) silt loam, gray (10YR 6/1) moist; many $^{1}/_{32}$- to $^{1}/_{2}$-inch pale brown (10YR 6/3) clay bands, brown (10YR 5/3) moist; massive; hard, firm, slightly sticky and nonplastic; few roots; slightly acid.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 0 to 5 percent
Content of clay: 35 to 50 percent in the upper 20 inches of the argillic horizon
Seasonal high water table: Present in winter and spring

Bw horizon:
Hue—10YR or 7.5YR
Value—5 to 7 dry, 2 to 5 moist
Chroma—2 to 5 dry or moist

C horizon:
Hue—10YR or 2.5Y
Value—6 to 8 dry, 5 or 6 moist
Chroma—1 or 2 dry or moist
Texture—ashy silt loam or ashy loam

2Bt horizon:
Hue—10YR or 2.5Y
Value—6 to 8 dry, 5 or 6 moist
Chroma—1 to 3 dry or moist
Texture—silty clay loam, silty clay, or clay

2C horizon:
Hue—10YR, 5Y, or 2.5Y
Value—6 to 8 dry, 4 to 6 moist
Chroma—1 to 3 dry or moist
Texture—stratified thin layers of silt loam, silty clay, silty clay loam, clay, or very fine sandy loam

Aquandic Cryaquepts

Soil depth: Very deep
Drainage class: Poorly drained
Landscape: Moraines and mountains
Position on landscape: Depressional areas
Parent material: Volcanic ash (7 to 14 inches) over alluvium
Slope: 0 to 3 percent
Elevation: 2,500 to 6,000 feet
Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 80 to 100 days
Taxonomic classification: Aquandic Cryaquepts

Reference Pedon

Aquandic Cryaquepts; Colville Indian Reservation, Washington; about 17 miles north of Nespelem, Washington; about 2,200 feet north and 300 feet west of the southeast corner of sec. 28, T. 34 N., R. 31 E.; latitude 48 degrees 25 minutes 1 second north and longitude 118 degrees 54 minutes 36 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, twigs, leaves, and moss; abrupt smooth boundary.
A—0 to 9 inches; grayish brown (10YR 5/2) ashy silt loam, very dark brown (10YR 2/2) moist; common medium distinct dark brown (7.5YR 3/4, moist) redoximorphic concentrations; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; common fine irregular pores; moderately acid; clear wavy boundary.
2Ab—9 to 17 inches; gray (10YR 5/1) fine sandy loam, very dark gray (10YR 3/1) moist; common fine distinct dark yellowish brown (10YR 3/6, moist) redoximorphic concentrations; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common fine irregular pores; 5 percent gravel; slightly acid; clear wavy boundary.
2Bg—17 to 22 inches; grayish brown (10YR 5/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine irregular pores; 30 percent gravel; moderately acid; abrupt wavy boundary.

2C1—22 to 28 inches; gray (10YR 6/1) loamy sand, dark gray (10YR 5/1) moist; massive; soft, very friable, nonsticky and nonplastic; 10 percent gravel; slightly acid; abrupt wavy boundary.
2C2—28 to 60 inches; multicolored extremely gravelly sand; 1 inch thick strata of dark gray (10YR 4/1) loamy fine sand at a depth of 30 inches, black (10YR 3/1) moist; single grain; loose, nonsticky and nonplastic; 65 percent gravel; slightly acid.

Range in Characteristics

Thickness of the umbric or ochric epipedon: 10 to 25 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches
Depth to the 2C horizon: 20 to 60 inches
Seasonal high water table: Present in winter, spring, and summer

A horizon:
Value—4 to 6 dry, 2 to 4 moist
Chroma—1 or 2 dry or moist
Content of gravel—0 to 10 percent

2Ab horizon:
Value—4 to 6 dry, 2 to 4 moist
Chroma—1 or 2 dry or moist
Texture—silt loam, loam, or fine sandy loam
Content of gravel—0 to 15 percent

2Bg horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—1 or 2 dry or moist
Texture—loam, fine sandy loam, sandy loam, gravelly loam, gravely fine sandy loam, or gravelly sandy loam
Content of gravel—0 to 35 percent

2C horizon:
Hue—10YR, 2.5Y, or multicolored
Value—4 to 7 dry, 3 to 5 moist
Chroma—1 or 2 dry or moist; individual sand grains may have chroma greater than 2.
Texture—fine sandy loam to extremely gravelly sand. Textures are highly variable, and stratification is common.
Content of gravel—5 to 70 percent

Aquandic Endoaquolls

Soil depth: Very deep
Drainage class: Very poorly drained
Landscape: Mountains
Position on landscape: Bottoms of drainageways, valley floors, and basin floors
Parent material: Volcanic ash (7 to 14 inches) over alluvium or glacial till
Slope: 0 to 10 percent
Elevation: 2,800 to 5,000 feet
Mean annual precipitation: 18 to 25 inches
Mean annual air temperature: 39 to 44 degrees F
Frost-free period: 80 to 100 days
Taxonomic classification: Aquandic Endoaquolls

Reference Pedon

Aquandic Endoaquolls, in an area Aquandic Endoaquolls-Haplosaprists complex, 0 to 10 percent slopes; Okanogan National Forest Area, Washington; about 2 miles

southeast of Wauconda, Washington; 2,100 feet west and 2,000 feet south of the northeast corner of sec. 34, T. 36 N., R. 29 E.; latitude 48 degrees 34 minutes 40 seconds north and longitude 119 degrees 10 seconds 53 seconds west.

Oe—0 to 4 inches; very dark gray (10YR 3/1) mucky peat, black (10YR 2/1) moist; about 40 percent fiber, 20 percent rubbed; soft, very friable, nonsticky and nonplastic; many very fine, fine, and medium roots; slightly acid; abrupt smooth boundary.

A1—4 to 11 inches; dark gray (10YR 4/1) ashy silt loam, black (10YR 2/1) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; moderately smeary; many very fine and fine and common medium roots; common fine tubular pores; slightly acid; clear wavy boundary.

2A2—11 to 18 inches; dark gray (10YR 4/1) silt loam, black (10YR 2/1) moist; few fine distinct yellowish brown (10YR 5/6, moist) redoximorphic concentrations; moderate fine and medium subangular blocky structure parting to moderate fine granular; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine and common medium roots; common fine tubular pores; slightly acid; clear wavy boundary.

2A3—18 to 23 inches; dark gray (10YR 4/1) silt loam, black (10YR 2/1) moist; common fine distinct yellowish brown (10YR 5/6, moist) redoximorphic concentrations; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine and common medium roots; common very fine and fine tubular pores; slightly acid; clear smooth boundary.

2Cg1—23 to 39 inches; light brownish gray (10YR 6/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; common fine and medium distinct yellowish brown (10YR 5/6) redoximorphic concentrations in the upper part; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; 3 percent gravel; slightly acid; clear wavy boundary.

3Cg2—39 to 60 inches; light gray (10YR 7/1) very gravelly sandy loam, light brownish gray (10YR 6/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; 35 percent gravel and 5 percent cobbles; slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 20 inches
Depth to very gravelly material (either till or alluvium): 20 to 50 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches
Seasonal high water table: Present throughout the year

Oe horizon:
- Value—2 or 3 dry
- Chroma—1 or 2 dry or moist

A horizon:
- Value—3 or 4 dry, 2 or 3 moist
- Chroma—1 or 2 dry or moist

2A horizon:
- Value—3 or 4 dry, 2 or 3 moist
- Chroma—1 or 2 dry or moist
- Texture—silt loam or loam

2Cg horizon:
- Value—5 to 7 dry, 3 to 5 moist
- Chroma—1 or 2 dry or moist
- Texture—fine sandy loam, silt loam, gravelly sandy loam, or very gravelly sandy loam
- Content of gravel—0 to 40 percent

3Cg horizon:
Value—5 to 7 dry, 3 to 6 moist
Chroma—1 or 2 dry or moist
Texture—very gravelly sandy loam, very gravelly coarse sand, or very gravelly loamy sand
Content of gravel—25 to 40 percent
Content of cobbles—5 to 10 percent

Aquandic Xerofluvents

Soil depth: Very deep
Drainage class: Somewhat poorly drained
Landscape: Mountains
Position on landscape: Flood plains and low stream terraces
Parent material: Volcanic ash (7 to 14 inches) over alluvium
Slope: 0 to 5 percent
Elevation: 2,000 to 3,800 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 100 to 130 days
Taxonomic classification: Aquandic Xerofluvents

Reference Pedon

Aquandic Xerofluvents, in an area Aquandic Xerofluvents, 0 to 5 percent slopes; Okanogan National Forest Area, Washington; about 14 miles north of Winthrop, Washington; 1,300 feet west and 1,100 feet north of the southeast corner of sec. 19, T. 37 N., R. 22 E.; latitude 48 degrees 41 minutes 12 seconds north and longitude 120 degrees 7 minutes 12 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, leaves, twigs, and grass; abrupt smooth boundary.
A—0 to 4 inches; grayish brown (10YR 5/2) ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine, common medium and coarse, and few very coarse roots; neutral; clear smooth boundary.
C—4 to 8 inches; pale brown (10YR 6/3) ashy sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine, common medium and coarse, and few very coarse roots; neutral; clear smooth boundary.
Ab—8 to 13 inches; grayish brown (10YR 5/2) ashy sandy loam, very dark brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; neutral; clear smooth boundary.
2C1—13 to 24 inches; light brownish gray (10YR 6/2) gravelly loamy sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; common very fine and fine roots; 15 percent gravel; neutral; clear smooth boundary.
2C2—24 to 44 inches; light brownish gray (10YR 6/2) sandy loam, dark grayish brown (10YR 4/2) moist; common fine and medium distinct yellowish brown (10YR 5/6) redoximorphic concentrations; massive; weak coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; 10 percent gravel; neutral; clear wavy boundary.
2C3—44 to 50 inches; light gray (10YR 7/2) very gravelly loamy sand, grayish brown (10YR 5/2) moist; many medium distinct yellowish brown (10YR 5/6)

redoximorphic concentrations; single grain; loose, nonsticky and nonplastic; 35 percent gravel; neutral; clear wavy boundary.

2C4—50 to 60 inches; light brownish gray (10YR 6/2) very gravelly loamy sand, grayish brown (10YR 5/2) moist; many medium distinct yellowish brown (10YR 5/6) redoximorphic concentrations; single grain; loose, nonsticky and nonplastic; 45 percent gravel; neutral.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 7 to 14 inches
Depth to very gravelly material: 40 to 60 inches
Seasonal high water table: Present in spring

A, C, and Ab horizons:
Value—4 to 6 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Content of gravel—0 to 5 percent

2C horizon:
Hue—10YR or multicolored
Value—5 to 7 dry, 4 to 6 moist
Chroma—1 to 3 dry, 1 or 2 moist
Redoximorphic concentrations—value of 4 or 5 and chroma of 5 or 6
Texture—sandy loam to very gravelly coarse sand; stratified in some pedons
Content of gravel—10 to 55 percent
Content of cobbles—0 to 5 percent

Aquic Dystrocryepts

Soil depth: Moderately deep or deep
Drainage class: Somewhat poorly drained
Landscape: Mountains
Position on landscape: Glacial-trough valleys; and toeslopes and footslopes of mountains
Parent material: Mixed volcanic ash (7 to 11 inches) over glacial till and alluvium
Slope: 0 to 25 percent
Elevation: 4,600 to 6,800 feet
Mean annual precipitation: 25 to 70 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days
Taxonomic classification: Aquic Dystrocryepts

Reference Pedon

Aquic Dystrocryepts, in an area of Myerscreek-Aquic Dystrocryepts complex, 0 to 25 percent slopes; Okanogan National Forest Area, Washington; about 10 miles northwest of Conconully, Washington; 2,500 feet east and 800 feet south of the northwest corner of sec. 21, T. 36 N., R. 23 E.; latitude 48 degrees 36 minutes 36 seconds north and longitude 119 degrees 57 minutes 36 seconds west.

Oe—3 inches to 0; moderately decomposed mat of needles, twigs, and leaves; abrupt smooth boundary.

A—0 to 6 inches; grayish brown (10YR 5/2) ashy fine sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; few fine pores; 5 percent gravel; slightly acid; clear smooth boundary.

AB—6 to 11 inches; grayish brown (10YR 5/2) ashy sandy loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky

and nonplastic; many very fine and fine and common medium and coarse roots; few fine irregular pores; 5 percent gravel; slightly acid; clear wavy boundary.

2Bw1—11 to 28 inches; brown (10YR 5/3) gravelly sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; few fine pores; 15 percent gravel and 3 percent cobbles; slightly acid; gradual wavy boundary.

2Bw2—28 to 34 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, grayish brown (10YR 5/2) moist; many fine and medium distinct yellowish brown (10YR 5/6) redoximorphic concentrations; massive; slightly hard, friable, slightly sticky and nonplastic; few very fine and fine roots; 25 percent gravel and 10 percent cobbles; slightly acid; gradual wavy boundary.

2Cd—34 to 60 inches; light gray (10YR 7/2) very gravelly sandy loam, grayish brown (10YR 5/2) moist; many fine and medium distinct yellowish brown (10YR 5/4) redoximorphic concentrations; massive; very hard, friable, slightly sticky and nonplastic; 30 percent gravel and 10 percent cobbles; slightly acid.

Range in Characteristics

Depth to redoximorphic features: 20 to 30 inches
Depth to bedrock or densic material: 20 to 60 inches
Thickness of the material influenced by mixed volcanic ash: 7 to 11 inches
Content of rock fragments in the particle-size control section: 20 to 60 percent
Seasonal high water table: Present in spring

A horizon:
Value—4 or 5 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Content of gravel—0 to 10 percent

AB horizon:
Hue—2.5Y or 10YR
Value—4 or 5 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—ashy sandy loam, ashy fine sandy loam, or gravelly ashy sandy loam
Content of gravel—5 to 25 percent

2Bw horizon:
Hue—2.5Y or 10YR
Value—5 to 7 dry, 4 or 5 moist
Chroma—1 to 3 dry or moist
Texture—gravelly or very gravelly sandy loam
Content of gravel—15 to 40 percent
Content of cobbles—0 to 5 percent

2Cd horizon:
Hue—2.5Y or 10YR
Value—6 or 7 dry, 4 or 5 moist
Chroma—1 or 2 dry or moist
Texture—gravelly, very gravelly, or very cobbly sandy loam
Content of gravel—15 to 40 percent
Content of cobbles—5 to 25 percent

Ashnola Series

Soil depth: Moderately deep or deep
Drainage class: Well drained
Landscape: Mountains

Position on landscape: Backslopes and footslopes
Parent material: Volcanic ash (14 to 22 inches) over glacial till
Slope: 15 to 65 percent
Elevation: 5,000 to 6,500 feet
Mean annual precipitation: 35 to 40 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Ashy over loamy-skeletal, amorphic over isotic Typic Vitricryands

Typical Pedon

Ashnola gravelly ashy sandy loam, in an area of Ashnola gravelly ashy sandy loam, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 6 miles north of Mazama, Washington; 1,400 feet west and 1,000 feet south of the northeast corner of sec. 29, T. 37 N., R. 20 E.; latitude 48 degrees 40 minutes 58 seconds north and longitude 120 degrees 22 minutes 10 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, twigs, and leaves; abrupt smooth boundary.
A—0 to 4 inches; brown (10YR 5/3) gravelly ashy sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and few medium and coarse roots; common very fine and fine irregular pores; 15 percent gravel; slightly acid; clear smooth boundary.
Bw1—4 to 9 inches; light yellowish brown (10YR 6/4) gravelly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and few medium and coarse roots; common very fine and fine irregular pores; 15 percent gravel; slightly acid; clear wavy boundary.
Bw2—9 to 16 inches; light yellowish brown (10YR 6/4) gravelly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and few medium roots; common very fine and fine irregular pores; 20 percent gravel and 2 percent cobbles; slightly acid; clear wavy boundary.
2C1—16 to 23 inches; light olive brown (2.5Y 5/3) very gravelly sandy loam, olive brown (2.5Y 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; few fine irregular pores; 35 percent gravel and 5 percent cobbles; neutral; gradual wavy boundary.
2C2—23 to 38 inches; light olive brown (2.5Y 5/3) very gravelly sandy loam, olive brown (2.5Y 5/3) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; few very fine and fine roots; few fine irregular pores; 40 percent gravel and 5 percent cobbles; neutral; gradual wavy boundary.
2Cd—38 to 60 inches; grayish brown (2.5Y 5/2) very gravelly sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots in the upper part; few fine irregular pores; 45 percent gravel and 5 percent cobbles; neutral.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 14 to 22 inches
Depth to densic material: 35 to 50 inches
Content of rock fragments in the particle-size control section: 15 to 25 percent in the upper part and 35 to 65 percent in the lower part

A horizon:
Value—5 or 6 dry
Content of gravel—10 to 20 percent
Content of cobbles—0 to 5 percent

Bw horizon:
Chroma—3 or 4 dry or moist
Content of gravel—15 to 25 percent
Content of cobbles—0 to 5 percent

2C horizon:
Hue—10YR or 2.5Y
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—30 to 45 percent
Content of cobbles—0 to 20 percent

2Cd horizon:
Hue—10YR or 2.5Y
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—30 to 45 percent
Content of cobbles—0 to 20 percent

Baldknob Series

Soil depth: Shallow
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Shoulders, ridges, and summits of mountains
Parent material: Residuum and colluvium from volcanic rock
Slope: 15 to 65 percent
Elevation: 2,500 to 4,300 feet
Mean annual precipitation: 15 to 22 inches
Mean annual air temperature: 44 to 50 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, mixed, superactive, frigid Lithic Ultic Haploxerolls

Typical Pedon

Baldknob gravelly ashy loam, in an area of Nicmar-Baldknob-Rock outcrop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 880 feet north of Highway 20; about 1,870 feet east and 1,030 feet south of the northwest corner of sec. 27, T. 37 N., R. 31 E.; Wauconda Summit USGS quadrangle; latitude 48 degrees 40 minutes 47 seconds north and longitude 118 degrees 53 minutes 47 seconds west.

A1—0 to 3 inches; grayish brown (10YR 5/2) gravelly ashy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and slightly plastic; common very fine and fine and few medium roots; common medium irregular pores; 15 percent gravel and 5 percent cobbles; neutral; clear smooth boundary.
A2—3 to 12 inches; grayish brown (10YR 5/2) very flaggy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine and fine and few medium roots; common medium irregular pores; 15 percent channers and 35 percent flagstones; neutral; clear wavy boundary.
R—12 inches; highly fractured rhyolite.

Range in Characteristics

Depth to bedrock: 10 to 20 inches
Thickness of the mollic epipedon: 7 to 12 inches
Content of rock fragments in the particle-size control section: 35 to 55 percent

A1 horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3 dry or moist

A2 horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3 dry or moist
Texture—very flaggy loam or very flaggy sandy loam
Content of channers—10 to 20 percent
Content of flagstones—25 to 45 percent

Bamber Series

Soil depth: Deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and footslopes
Parent material: Volcanic ash (40 to 60 inches) over bedrock
Slope: 35 to 65 percent
Elevation: 4,000 to 6,500 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 37 to 39 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Ashy-skeletal, glassy Xeric Vitricryands

Typical Pedon

Bamber ashy loam; North Ferry Area, Washington; about 50 yards east of Sheridan Road, 1/4 mile inside the forest boundary; SW1/4 sec. 30, T. 38 N., R. 32 E.; latitude 48 degrees 45 minutes 50 seconds north and longitude 118 degrees 49 minutes 56 seconds west.

Oe—1 inch to 0; moderately decomposed mat of grass, leaves, needles, and twigs.
C—0 to 7 inches; light brownish gray (10YR 6/2) ashy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, friable, nonsticky and nonplastic; many fine roots; slightly acid; clear wavy boundary.
Bw1—7 to 11 inches; very pale brown (10YR 7/4) gravelly ashy loam, dark yellowish brown (10YR 4/4) moist; weak medium and fine granular structure; soft, friable, nonsticky and nonplastic; common fine roots; peds coated with clear sand grains; 20 percent angular pebbles; slightly acid; clear wavy boundary.
Bw2—11 to 18 inches; pink (7.5YR 7/4) gravelly ashy loam, brown (7.5YR 4/4) moist; weak medium and coarse granular structure; soft, friable, nonsticky and nonplastic; common fine roots; 25 percent angular pebbles; slightly acid; clear wavy boundary.
BC—18 to 42 inches; pink (7.5YR 7/4) extremely gravelly ashy loam, strong brown (7.5YR 5/6) moist; weak medium and fine blocky structure; soft, friable, nonsticky and nonplastic; common fine roots; 60 percent angular pebbles; neutral; clear wavy boundary.
2R—42 inches; fractured andesite.

Range in Characteristics

Depth to bedrock: 40 to 60 inches
Thickness of the material influenced by volcanic ash: 40 to 60 inches
Content of rock fragments in the particle-size control section: 35 to 65 percent

C horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—1 or 2 dry or moist

Bw horizon:
Hue—10YR or 7.5YR
Value—6 or 7 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—gravelly, very gravelly, cobbly, or very cobbly ashy loam

BC horizon:
Hue—10YR or 7.5YR
Value—6 or 7 dry, 4 or 5 moist
Chroma—4 to 6 dry or moist
Texture—extremely gravelly or very cobbly ashy loam

Banker Series

Soil depth: Shallow
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Shoulders, ridges, and back slopes of mountains
Parent material: Volcanic ash (3 to 6 inches) over colluvium and residuum
Slope: 35 to 65 percent
Elevation: 4,400 to 5,900 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Loamy-skeletal, isotic Lithic Eutrocryepts

Typical Pedon

Banker channery ashy sandy loam, in an area of Finney-Banker complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; 600 feet west and 2,600 feet south of the northeast corner of sec. 12, T. 36 N., R. 20 E.; latitude 48 degrees 38 minutes 10 seconds north and longitude 120 degrees 16 minutes 30 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.
A—0 to 4 inches; pale brown (10YR 6/3) channery ashy sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; few fine irregular pores; 20 percent channers; slightly acid; clear smooth boundary.
2Bw—4 to 13 inches; light yellowish brown (10YR 6/4) very channery sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; moderately smeary; common very fine and fine and few medium roots; few fine irregular pores; 30 percent channers and 5 percent flagstones; slightly acid; clear wavy boundary.
2C—13 to 18 inches; light brownish gray (10YR 6/2) very channery sandy loam, grayish brown (10YR 5/2) moist; massive; soft, very friable, nonsticky and

nonplastic; common very fine and fine roots; few very fine irregular pores; 45 percent channers and 5 percent flagstones; neutral; clear wavy boundary.
2R—18 inches; shale.

Range in Characteristics

Depth to bedrock: 10 to 20 inches
Thickness of the material influenced by volcanic ash: 3 to 6 inches
Content of rock fragments in the particle-size control section: 35 to 65 percent
Soil moisture regime: Xeric

A horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Content of channers—15 to 25 percent

2Bw horizon:
Value—3 or 4 moist
Chroma—3 or 4 dry or moist
Texture—very channery or very flaggy sandy loam
Content of channers—25 to 40 percent
Content of flagstones—0 to 20 percent

2C horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very channery, very flaggy, or extremely channery sandy loam
Content of channers—30 to 45 percent
Content of flagstones—5 to 20 percent

Bearspring Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and footslopes
Parent material: Mixed volcanic ash (10 to 15 inches) over colluvium from granitic rock
Slope: 35 to 65 percent
Elevation: 2,800 to 4,300 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Haploxerolls

Typical Pedon

Bearspring gravelly ashy sandy loam, in an area of Bearspring gravelly ashy sandy loam, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 5 miles north of Conconully, Washington; 2,400 feet west and 300 feet north of the southeast corner of sec. 14, T. 36 N., R. 24 E.; latitude 48 degrees 36 minutes 44 seconds north and longitude 119 degrees 47 minutes 9 seconds west.

Oe—1 inch to 0; moderately decomposed mat of twigs, needles, and leaves.
A1—0 to 7 inches; dark grayish brown (10YR 4/2) gravelly ashy sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common very fine and fine tubular pores; 15 percent gravel; neutral; clear smooth boundary.

A2—7 to 12 inches; dark grayish brown (10YR 4/2) gravelly ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common very fine and fine tubular pores; 15 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
2Bw—12 to 19 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; few fine irregular pores; 15 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
2C1—19 to 36 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; 35 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
2C2—36 to 60 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; 45 percent gravel and 5 percent cobbles; neutral.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 10 to 15 inches
Thickness of the mollic epipedon: 10 to 15 inches
Content of rock fragments in the particle-size control section: 35 to 65 percent

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3 moist or dry
Content of gravel—15 to 25 percent
Content of cobbles—0 to 5 percent

2Bw horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—gravelly, very gravelly, or very cobbly sandy loam
Content of gravel—15 to 30 percent
Content of cobbles—0 to 20 percent

2C horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—35 to 50 percent
Content of cobbles—5 to 20 percent
Content of stones—0 to 5 percent

Bluebuck Series

Soil depth: Deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial till and glacial outwash from granitic rock
Slope: 35 to 65 percent
Elevation: 4,600 to 6,200 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Sandy-skeletal, isotic Vitrandic Eutrocryepts

Typical Pedon

Bluebuck stony ashy sandy loam, in an area of Bluebuck stony ashy sandy loam, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 7 miles east of Winthrop, Washington; 700 feet east and 500 feet south of the northwest corner of sec. 36, T. 35 N., R. 22 E.; latitude 48 degrees 29 minutes 55 seconds north and longitude 120 degrees 1 minute 57 seconds west.

Oi—1 inch to 0; slightly decomposed mat of needles and twigs; abrupt smooth boundary.

C—0 to 1 inch; light gray (10YR 7/2) ashy fine sandy loam, grayish brown (10YR 5/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; few fine pores; slightly acid; irregular broken boundary.

2A—1 to 3 inches; pale brown (10YR 6/3) stony ashy sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine and few medium and coarse roots; common fine tubular pores; 10 percent gravel and 5 percent stones; slightly acid; clear wavy boundary.

2Bw—3 to 11 inches; light yellowish brown (10YR 6/4) gravelly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and few coarse roots; common fine irregular pores; 15 percent gravel, 5 percent cobbles, and 2 percent stones; slightly acid; clear wavy boundary.

3CB—11 to 24 inches; light yellowish brown (10YR 6/4) very gravelly loamy sand, yellowish brown (10YR 5/4) moist; many medium and coarse yellowish brown (10YR 5/6, moist) stains; single grain; loose, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; 35 percent gravel, 5 percent cobbles, and 5 percent stones; slightly acid; clear wavy boundary.

4C1—24 to 35 inches; multicolored extremely gravelly coarse sand; single grain; loose, nonsticky and nonplastic; common very fine and fine roots; 65 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.

5C2—35 to 54 inches; very pale brown (10YR 7/4) very gravelly loamy sand, light yellowish brown (10YR 6/4) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; 40 percent gravel, 5 percent cobbles, and 5 percent stones; slightly acid; gradual wavy boundary.

5Cd—54 to 60 inches; very pale brown (10YR 7/3) very gravelly loamy sand, pale brown (10YR 6/3) moist; massive; hard, friable, nonsticky and nonplastic; few very fine roots; 35 percent gravel and 5 percent cobbles; slightly acid.

Range in Characteristics

Depth to glacial till and glacial outwash: 7 to 14 inches
Depth to densic material: 40 to 60 inches
Thickness of the material influenced by mixed volcanic ash: 7 to 14 inches thick
Content of rock fragments in the particle-size control section: 40 to 70 percent
Soil moisture regime: Xeric
Note: Not all pedons have a C horizon.

C horizon (where present):
Content of gravel—5 to 10 percent
Content of cobbles—0 to 5 percent
Content of stones—5 to 10 percent

2A horizon:
Value—3 or 4 moist
Content of gravel—5 to 10 percent

Content of cobbles—0 to 5 percent
Content of stones—5 to 10 percent

2Bw horizon:
Chroma—3 or 4 dry or moist
Texture—gravelly ashy sandy loam or ashy sandy loam
Content of gravel—5 to 15 percent
Content of cobbles—0 to 5 percent
Content of stones—0 to 3 percent

3CB horizon:
Hue—10YR or 2.5Y
Value—4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—very gravelly loamy sand, extremely gravelly coarse sand, or very cobbly loamy coarse sand
Content of gravel—35 to 55 percent
Content of cobbles—5 to 25 percent
Content of stones—0 to 10 percent

4C1 horizon:
Hue—multicolored
Texture—extremely gravelly coarse sand or extremely gravelly loamy coarse sand
Content of gravel—55 to 65 percent
Content of cobbles—5 to 15 percent

5C2 horizon:
Hue—10YR or 2.5Y
Value—6 or 7 dry, 5 or 6 moist
Chroma—3 to 6 dry, 3 or 4 moist
Texture—very gravelly loamy sand, extremely cobbly coarse sand, or very stony loamy coarse sand
Content of gravel—35 to 55 percent
Content of cobbles—5 to 30 percent
Content of stones—0 to 25 percent

5Cd horizon:
Hue—10YR or 2.5Y
Value—6 or 7 dry, 5 or 6 moist
Chroma—3 to 6 dry, 3 or 4 moist
Texture—very gravelly, extremely gravelly, or very cobbly loamy sand
Content of gravel—30 to 50 percent
Content of cobbles—5 to 20 percent
Content of stones—0 to 5 percent

Boesel Series

Soil depth: Very deep
Drainage class: Moderately well drained
Landscape: Mountains
Position on landscape: Stream terraces and flood plains
Parent material: Alluvium
Slope: 0 to 3 percent
Elevation: 1,500 to 3,200 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 90 to 120 days

Taxonomic classification: Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Cumulic Haploxerolls

Typical Pedon

Boesel fine sandy loam; Okanogan County Area, Washington; 200 feet north and 1,780 feet east of the southwest corner of sec. 26, T. 35 N., R. 21 E.; latitude 48 degrees 29 minutes 56 seconds north and longitude 120 degrees 10 minutes 46 seconds west.

A—0 to 8 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium and fine granular structure; soft, very friable, nonsticky and slightly plastic; many roots; neutral; abrupt smooth boundary.

AC—8 to 27 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky and slightly plastic; common roots; common medium and coarse pores; neutral; clear wavy boundary.

2C1—27 to 37 inches; light yellowish brown (10YR 6/4) loamy sand, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few roots; few fine pores; 5 percent gravel; neutral; abrupt wavy boundary.

2C2—37 to 46 inches; light yellowish brown (10YR 6/4) extremely gravelly coarse sand, yellowish brown (10YR 5/4) moist; single grain; loose; 60 percent gravel and 5 percent cobbles; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 20 to 33 inches
Depth to the 2C horizon: 20 to 33 inches
Content of rock fragments in the upper part of the soil: 0 to 15 percent
Content of rock fragments in the lower part of the soil: 15 to 50 percent
Seasonal high water table: Present in winter and spring

A horizon:
- Value—4 or 5 dry, 2 or 3 moist
- Chroma—2 or 3 dry or moist
- Content of gravel—0 to 10 percent

AC horizon:
- Value—5 or 6 dry, 3 or 4 moist
- Chroma—2 or 3 dry or moist
- Texture—fine sandy loam or sandy loam
- Content of gravel—0 to 10 percent

2C horizon:
- Hue—10YR or multicolored
- Value—5 or 6 dry, 3 or 4 moist
- Chroma—3 or 4 dry or moist
- Texture—loamy sand, sand, or coarse sand; nongravelly to extremely gravelly
- Content of gravel—0 to 65 percent
- Content of cobbles—0 to 10 percent

Bong Series

Soil depth: Very deep
Drainage class: Somewhat excessively drained
Landscape: Foothills and mountains
Position on landscape: Terraces and terrace escarpments
Parent material: Mixed volcanic ash (7 to 16 inches) over glacial outwash
Slope: 35 to 65 percent

Elevation: 2,100 to 3,000 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 130 days
Taxonomic classification: Sandy, mixed, mesic Vitrandic Haploxerolls

Typical Pedon

Bong ashy sandy loam, in an area of Bong ashy sandy loam, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 300 feet east and 1,300 feet south of the northwest corner of sec. 5, T. 32 N., R. 23 E.; latitude 48 degrees 18 minutes 17 seconds north and longitude 119 degrees 59 minutes 28 seconds west.

A1—0 to 6 inches; brown (10YR 5/3) ashy sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine tubular pores; 5 percent gravel; neutral; clear smooth boundary.
A2—6 to 10 inches; brown (10YR 5/3) ashy sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine tubular pores; 10 percent gravel; neutral; clear smooth boundary.
Bw—10 to 16 inches; brown (10YR 5/3) gravelly ashy sandy loam, dark brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common fine irregular pores; 15 percent gravel; neutral; clear wavy boundary.
2C1—16 to 26 inches; light gray (10YR 7/2) gravelly loamy coarse sand, light brownish gray (10YR 6/2) moist; single grain; loose; few very fine and fine roots in the upper part; 15 percent gravel; neutral; gradual wavy boundary.
2C2—26 to 60 inches; multicolored gravelly coarse sand; single grain; loose; 15 percent gravel; neutral.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 7 to 16 inches
Thickness of the mollic epipedon: 8 to 15 inches
Depth to the 2C horizon: 15 to 30 inches
Content of rock fragments in the particle-size control section: 5 to 25 percent

A horizon:
Value—3 to 5 dry
Chroma—2 or 3 dry or moist
Content of gravel—0 to 10 percent

Bw horizon:
Value—4 or 5 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—gravelly ashy sandy loam, ashy coarse sandy loam, or ashy sandy loam
Content of gravel—5 to 15 percent

2C horizon:
Value—6 or 7 dry, 5 or 6 moist
Chroma—2 or 3 dry or moist; multicolored in some pedons
Texture—gravelly loamy coarse sand, coarse sand, or gravelly coarse sand
Content of gravel—5 to 30 percent

Borgeau Series

Soil depth: Very deep
Drainage class: Well drained

Landscape: Mountains
Position on landscape: Backslopes
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial till and colluvium derived from volcanic rocks
Slope: 15 to 65 percent
Elevation: 2,500 to 4,500 feet
Mean annual precipitation: 14 to 22 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 110 to 140 days
Taxonomic classification: Loamy-skeletal, isotic, mesic Vitrandic Haploxerolls

Typical Pedon

Borgeau ashy loam, in an area of Borgeau-Nicmar-Johntom complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 5 miles north of Bodie, Washington; 1,800 feet south and 2,200 feet east of the northwest corner of sec. 3, T. 39 N., R. 31 E.; Bodie Mountain NW USGS topographic quadrangle; latitude 48 degrees 54 minutes 40 seconds north and longitude 118 degrees 54 minutes 10 seconds west.

A1—0 to 5 inches; very dark grayish brown (10YR 5/2) ashy loam, grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, friable, nonsticky and slightly plastic; common very fine and fine roots; 10 percent gravel; neutral; clear smooth boundary.

A2—5 to 14 inches; brown (10YR 5/3) gravelly ashy loam, brown (10YR 3/3) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and slightly plastic; common fine and few medium roots; 25 percent gravel and 5 percent cobbles; neutral; gradual wavy boundary.

2Bw—14 to 27 inches; brown (10YR 5/4) very gravelly loam, yellowish brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and few medium roots; 40 percent gravel and 5 percent cobbles; neutral; gradual wavy boundary.

2BC—27 to 41 inches; brown (10YR 5/3) very gravelly loam, brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; few fine and medium roots; 50 percent gravel and 5 percent cobbles; slightly alkaline; gradual wavy boundary.

2C—41 to 60 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and slightly plastic; few fine roots; 45 percent gravel and 5 percent cobbles; slightly alkaline.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 7 to 14 inches
Thickness of the mollic epipedon: 12 to 17 inches
Content of rock fragments in the particle-size control section: 40 to 60 percent

A horizon:
Chroma—2 or 3 moist or dry
Content of gravel—5 to 25 percent
Content of cobbles—0 to 5 percent

2Bw horizon:
Hue—10YR or 2.5Y
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 moist or dry
Texture—gravelly or very gravelly loam
Content of gravel—20 to 45 percent
Content of cobbles—0 to 5 percent

2BC horizon (where present):
Hue—10YR or 2.5Y
Value—4 or 5 dry, 3 or 4 moist
Chroma—3 or 4 moist or dry
Texture—very gravelly or very cobbly loam or very gravelly sandy loam
Content of gravel—35 to 50 percent
Content of cobbles—0 to 20 percent
Content of stones—0 to 5 percent

2C horizon:
Hue—10YR or 2.5Y
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 to 4 moist or dry
Texture—very gravelly or very cobbly sandy loam
Content of gravel—35 to 50 percent
Content of cobbles—0 to 20 percent
Content of stones—0 to 5 percent

Brevco Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, shoulders, and ridges
Parent material: Mixed volcanic ash (10 to 14 inches) over colluvium and residuum from granitic rocks
Slope: 15 to 65 percent
Elevation: 3,000 to 5,500 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 39 to 46 degrees F
Frost-free period: 85 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts

Typical Pedon

Brevco gravelly ashy coarse sandy loam, in an area of Wapal-Brevco complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 7 miles north of Winthrop, Washington; about 1 mile northeast of Ramsey Peak; Lewis Butte USGS topographic quadrangle; latitude 48 degrees 34 minutes 5 seconds north and longitude 120 degrees 7 minutes 37 seconds west.

Oi—1 inch to 0; slightly decomposed organic matter consisting of needles and grasses.
A—0 to 3 inches; very pale brown (10YR 7/3) gravelly ashy coarse sandy loam, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and very fine and common medium and coarse roots; common fine irregular pores; 5 percent stones, 5 percent cobbles, and 15 percent gravel; neutral; clear smooth boundary.
Bw—3 to 11 inches; very pale brown (10YR 7/4) gravelly ashy coarse sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many fine and very fine and common medium and coarse roots; common fine irregular pores; 25 percent gravel; slightly acid; clear wavy boundary.
2C1—11 to 25 inches; very pale brown (10YR 8/3) very gravelly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; many fine

and common medium and coarse roots; 30 percent gravel and 15 percent cobbles; moderately acid; gradual wavy boundary.
2C2—25 to 38 inches; very pale brown (10YR 7/4) very cobbly coarse sandy loam, light yellowish brown (10YR 6/4) moist; massive; soft, very friable, nonsticky and nonplastic; common fine and medium roots; 25 percent gravel and 30 percent cobbles; moderately acid; abrupt irregular boundary.
2R—38 inches; fractured granite.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the material influenced by mixed volcanic ash: 10 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent

A horizon:
Value—6 or 7 dry
Chroma—2 or 3 moist or dry
Texture—stony ashy coarse sandy loam or gravelly ashy coarse sandy loam
Content of gravel—15 to 20 percent
Content of cobbles—0 to 5 percent
Content of stones—0 to 10 percent

Bw horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 to 4 dry or moist
Texture—gravelly ashy coarse sandy loam or gravelly ashy sandy loam
Content of gravel—15 to 25 percent
Content of cobbles—0 to 10 percent
Content of stones—0 to 5 percent

2C horizon:
Value—7 or 8 dry, 5 or 6 moist
Chroma—2 to 4 dry or moist
Texture—very gravelly sandy loam, very gravelly coarse sandy loam, or very cobbly coarse sandy loam
Content of gravel—25 to 50 percent
Content of cobbles—5 to 30 percent
Content of stones—0 to 5 percent

Bromas Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and shoulders
Parent material: Volcanic ash (7 to 14 inches) over residuum and colluvium from granitic and metamorphic rocks
Slope: 35 to 65 percent
Elevation: 4,200 to 6,400 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 41 degrees F
Frost-free period: 60 to 90 days
Taxonomic classification: Sandy-skeletal, isotic Andic Eutrocryepts

Typical Pedon

Bromas ashy sandy loam, in an area of Bromas-Sitdown complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 15 miles north of

Winthrop, Washington; about 1.5 miles northwest of South Twentymile Peak in the Okanogan National Forest; latitude 48 degrees 40 minutes 52 seconds north and longitude 120 degrees 5 minutes 0 seconds west.

Oe—2 inches to 0; moderately decomposed mat of organic matter consisting of needles, twigs, grasses.

A—0 to 4 inches; pale brown (10YR 6/3) ashy sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many fine and very fine and common medium roots; common fine irregular pores; 10 percent gravel; slightly acid; clear smooth boundary.

Bw—4 to 12 inches; light yellowish brown (10YR 6/4) cobbly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many fine and very fine, common medium, and few coarse roots; common fine irregular pores; 15 percent gravel and 10 percent cobbles; slightly acid; clear wavy boundary.

2C1—12 to 31 inches; light gray (10YR 7/2) very gravelly loamy sand, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine, fine, and medium roots; 30 percent gravel, 15 percent cobbles, and 5 percent stones; slightly acid; gradual wavy boundary.

3C2—31 to 37 inches; light gray (2.5Y 7/2) very gravelly sandy loam, light olive brown (2.5Y 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common medium and few fine roots; common irregular pores; 35 percent gravel, 10 percent cobbles, and 5 percent stones; neutral; gradual wavy boundary.

3Cr—37 inches; weathered gneiss.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the material influenced by mixed volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 55 percent
Soil moisture regime: Xeric

A horizon:
- Value—5 or 6 dry, 3 or 4 moist
- Chroma—3 or 4 dry or moist
- Texture—ashy sandy loam or stony ashy sandy loam
- Content of gravel—0 to 15 percent
- Content of cobbles—0 to 5 percent
- Content of stones—0 to 15 percent

Bw horizon:
- Value—6 or 7 dry
- Texture—gravelly or cobbly ashy sandy loam
- Content of gravel—10 to 20 percent
- Content of cobbles—5 to 10 percent

2C horizon:
- Hue—10YR or 2.5Y
- Value—7 or 8 dry, 5 or 6 moist
- Chroma—2 to 4 dry or moist
- Texture—very gravelly or very cobbly loamy sand
- Content of gravel—25 to 45 percent
- Content of cobbles—10 to 20 percent
- Content of stones—0 to 5 percent

3C horizon:
- Value—6 or 7 dry, 5 or 6 moist
- Chroma—2 to 4 dry or moist

Burget Series

Soil depth: Shallow
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Shoulders, ridges, and backslopes, generally on southerly aspects
Parent material: Mixed volcanic ash (7 to 11 inches) over residuum and colluvium from granitic and metamorphic rock
Slope: 15 to 65 percent
Elevation: 5,200 to 7,000 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Loamy, mixed, superactive, shallow Vitrandic Dystrocryepts

Typical Pedon

Burget stony ashy coarse sandy loam, in an area of Crocamp-Burget complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 14 miles southwest of Loomis, Washington; about 100 feet south and 2,400 feet east of the northwest corner of sec. 35, T. 38 N., R. 23 E.; latitude 48 degrees 45 minutes 20 seconds north and longitude 119 degrees 55 minutes 3 seconds west.

A—0 to 8 inches; grayish brown (10YR 5/2) stony ashy coarse sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; common fine and medium roots; common fine irregular pores; 10 percent gravel, 10 percent cobbles, and 5 percent stones; slightly acid; clear wavy boundary.
2Bw—8 to 11 inches; pale brown (10YR 6/3) cobbly coarse sandy loam, dark yellowish brown (10YR 3/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and slightly plastic; few fine roots; common fine tubular pores; 10 percent gravel and 10 percent cobbles; moderately acid; abrupt wavy boundary.
2Cr—11 inches; weathered granite.

Range in Characteristics

Depth to bedrock: 10 to 20 inches
Thickness of the material influenced by mixed volcanic ash: 7 to 11 inches
Content of rock fragments in the particle-size control section: 15 to 35 percent
Thickness of the umbric epipedon: 7 to 11 inches
Soil moisture regime: Xeric

A horizon:
Value—4 or 5 dry, 1 to 3 moist
Chroma—1 to 3 dry or moist
Content of gravel—5 to 15 percent
Content of cobbles—5 to 15 percent
Content of stones—0 to 5 percent

2Bw horizon:
Value—5 or 6 dry, 3 to 5 moist
Chroma—3 or 4 dry or moist
Content of gravel—10 to 20 percent
Content of cobbles—10 to 25 percent

Burpeak Series

Soil depth: Deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes
Parent material: Volcanic ash (25 to 35 inches) over colluvium from volcanic rock
Slope: 65 to 90 percent
Elevation: 4,800 to 5,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Ashy-skeletal over loamy-skeletal, glassy over isotic Xeric Vitricryands

Typical Pedon

Burpeak stony ashy sandy loam, in an area of Burpeak-Rock outcrop complex, 65 to 90 percent slopes; Okanogan National Forest Area, Washington; about 17 miles north of Winthrop, Washington; 2,500 feet east and 1,000 feet north of the southwest corner of sec. 9, T. 38 N., R. 20 E.; latitude 48 degrees 46 minutes 24 seconds north and longitude 120 degrees 18 minutes 34 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.
A—0 to 4 inches; pale brown (10YR 6/3) stony ashy sandy loam, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium and coarse roots; common fine irregular pores; 15 percent gravel, 5 percent cobbles, and 10 percent stones; slightly acid; clear smooth boundary.
Bw1—4 to 10 inches; light yellowish brown (10YR 6/4) very cobbly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium and coarse roots; common fine and very fine irregular pores; 15 percent gravel, 25 percent cobbles, and 5 percent stones; slightly acid; clear smooth boundary.
Bw2—10 to 25 inches; light yellowish brown (10YR 6/4) very cobbly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine roots; few fine and very fine irregular pores; 25 percent gravel, 25 percent cobbles, and 5 percent stones; slightly acid; clear wavy boundary.
Bw3—25 to 32 inches; light yellowish brown (10YR 6/4) very stony ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine roots; few irregular pores; 20 percent gravel, 20 percent cobbles, and 15 percent stones; slightly acid; gradual wavy boundary.
2BC—32 to 45 inches; pale brown (10YR 6/3) very stony sandy loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine irregular pores; 20 percent gravel, 15 percent cobbles, and 20 percent stones; slightly acid; gradual wavy boundary.
2R—45 inches; fractured andesite.

Range in Characteristics

Depth to bedrock: 40 to 60 inches
Thickness of the material influenced by volcanic ash: 25 to 35 inches
Content of rock fragments in the particle-size control section: 35 to 70 percent in the upper part and 40 to 80 percent in the lower part

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Content of gravel—10 to 15 percent
Content of cobbles—0 to 10 percent
Content of stones—5 to 15 percent

Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 to 6 dry or moist
Texture—very cobbly, extremely cobbly, or very stony ashy sandy loam
Content of gravel—15 to 25 percent
Content of cobbles—20 to 40 percent
Content of stones—5 to 15 percent

2BC horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 to 4 dry or moist
Texture—very cobbly, extremely cobbly, or very stony sandy loam
Content of gravel—15 to 25 percent
Content of cobbles—20 to 40 percent
Content of stones—15 to 25 percent

Buttoncreek Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Fans and footslopes
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 5 to 25 percent
Elevation: 3,200 to 3,900 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 43 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Loamy-skeletal, isotic Andic Eutrocryepts

Typical Pedon

Buttoncreek gravelly ashy fine sandy loam, in an area of Buttoncreek gravelly ashy fine sandy loam, 5 to 25 percent slopes; Okanogan National Forest Area, Washington; about 21 miles north-northwest of Winthrop, Washington; 2,150 feet west and 650 feet north of the southeast corner of sec. 1, T. 37 N., R. 20 E.; latitude 48 degrees 43 minutes 53 seconds north and longitude 120 degrees 17 minutes 6 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.

A—0 to 6 inches; grayish brown (10YR 5/2) gravelly ashy fine sandy loam, dark brown (10YR 3/3) moist; weak very fine and fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; moderately smeary; common very fine and fine and few medium and coarse roots; many very fine and fine interstitial pores; 25 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.

Bw—6 to 13 inches; light yellowish brown (10YR 6/4) very cobbly ashy fine sandy loam, dark brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; moderately smeary; many very fine and fine and few medium and coarse roots; many very fine and fine

interstitial pores; 30 percent gravel and 20 percent cobbles; slightly acid; clear wavy boundary.
2C1—13 to 25 inches; light brownish gray (10YR 6/2) extremely cobbly sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine interstitial pores; 35 percent gravel and 30 percent cobbles; slightly acid; gradual wavy boundary.
2C2—25 to 32 inches; light brownish gray (10YR 6/2) extremely gravelly sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine interstitial pores; 55 percent gravel and 15 percent cobbles; slightly acid; clear wavy boundary.
3C3—32 to 60 inches; light brownish gray (10YR 6/2) extremely gravelly loamy sand, brown (10YR 4/3) moist; loose, nonsticky and nonplastic; few very fine roots; many very fine and fine interstitial pores; 60 percent gravel and 20 percent cobbles; slightly acid.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 65 to 80 percent
Soil moisture regime: Xeric

A horizon:
Value—4 to 6 dry, 2 to 4 moist
Chroma—2 or 3 dry or moist
Content of gravel—10 to 25 percent
Content of cobbles—0 to 15 percent

Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Texture—very cobbly or very gravelly ashy fine sandy loam
Content of gravel—25 to 40 percent
Content of cobbles—10 to 30 percent

2C horizon:
Value—5 to 7 dry, 4 to 6 moist
Chroma—2 or 3 dry or moist
Texture—extremely gravelly or extremely cobbly sandy loam
Content of gravel—45 to 60 percent
Content of cobbles—10 to 30 percent

3C horizon:
Value—5 to 7 dry, 4 to 6 moist
Chroma—2 or 3 dry or moist
Texture—extremely gravelly loamy sand or extremely gravelly sand
Content of gravel—50 to 70 percent
Content of cobbles—5 to 25 percent

Cassal Series

Soil depth: Deep
Drainage class: Moderately well drained
Landscape: Mountains
Position on landscape: Toeslopes and footslopes
Parent material: Mixed volcanic ash (12 to 18 inches) over glacial till
Slope: 5 to 25 percent
Elevation: 2,700 to 3,900 feet

Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Haploxerolls

Typical Pedon

Cassal ashy loam, in an area of Cassal ashy loam, 5 to 25 percent slopes; Okanogan National Forest Area, Washington; about 4 miles southeast of Mazama, Washington; about 2,100 feet south and 250 feet west of the northeast corner of sec. 3, T. 35 N., R. 20 E.; latitude 48 degrees 33 minutes 54 seconds north and longitude 120 degrees 19 minutes 32 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.
A1—0 to 4 inches; very dark grayish brown (10YR 3/2) ashy loam, black (10YR 2/1) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; common very fine and fine pores; 3 percent gravel; neutral; clear smooth boundary.
A2—4 to 13 inches; very dark grayish brown (10YR 3/2) ashy loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common very fine and fine pores; 5 percent gravel; neutral; clear wavy boundary.
AB—13 to 18 inches; dark brown (10YR 4/3) ashy sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; common very fine and fine pores; 5 percent gravel; slightly acid; clear wavy boundary.
2C1—18 to 35 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; few fine pores; few fine faint yellowish brown (10YR 5/6) redoximorphic concentrations in lower part; 30 percent gravel and 10 percent cobbles; neutral; clear wavy boundary.
2C2—35 to 46 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, gray (10YR 5/1) moist; massive; soft, friable, slightly sticky and nonplastic; few very fine, fine, and medium roots; few very fine pores; common fine and medium faint yellowish brown (10YR 5/6) redoximorphic concentrations; 35 percent gravel and 10 percent cobbles; neutral; gradual wavy boundary.
3Cd—46 to 60 inches; light gray (10YR 7/2) very gravelly sandy loam, light brownish gray (10YR 6/2) moist; massive; hard, friable, slightly sticky and nonplastic; few very fine roots; many fine and medium distinct yellowish brown (10YR 5/6) redoximorphic concentrations; 40 percent gravel and 10 percent cobbles; slightly acid.

Range in Characteristics

Depth to densic material: 40 to 60 inches
Thickness of the material influenced by mixed volcanic ash: 12 to 18 inches
Content of rock fragments in the particle-size control section: 35 to 55 percent
Thickness of the mollic epipedon: 10 to 18 inches
Depth to redoximorphic features: 30 to 45 inches
Seasonal high water table: Present in spring

A horizon:
Chroma—1 or 2 moist
Content of gravel—0 to 10 percent

AB horizon:
Value—3 or 4 dry, 2 or 3 moist
Chroma—2 or 3 dry or moist
Texture—ashy sandy loam or ashy loam
Content of gravel—5 to 10 percent

2C horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry, 1 to 3 moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—25 to 35 percent
Content of cobbles—10 to 20 percent

3Cd horizon:
Value—6 or 7 dry, 5 or 6 moist
Chroma—2 or 3 dry, 1 or 2 moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—30 to 40 percent
Content of cobbles—10 to 20 percent

Chewack Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes
Parent material: Volcanic ash (20 to 35 inches) over glacial till
Slope: 35 to 65 percent
Elevation: 4,400 to 6,400 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days
Taxonomic classification: Ashy-skeletal over loamy-skeletal, glassy over isotic Xeric Vitricryands

Typical Pedon

Chewack very stony ashy sandy loam, in an area of Chewack-Sitdown-Rock outcrop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 14 miles north-northeast of Winthrop, Washington; 400 feet west and 700 feet south of the northeast corner of sec. 9, T. 37 N., R. 22 E.; latitude 48 degrees 43 minutes 28 seconds north and longitude 120 degrees 4 minutes 47 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.
A—0 to 3 inches; light brownish gray (10YR 6/2) very stony ashy sandy loam, dark grayish brown (10YR 4/2) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine irregular pores; 15 percent gravel, 10 percent cobbles, and 10 percent stones; slightly acid; clear wavy boundary.
Bw—3 to 23 inches; pale brown (10YR 6/3) very cobbly ashy sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common fine irregular pores; 20 percent gravel, 20 percent cobbles, and 5 percent stones; slightly acid; gradual wavy boundary.
2C—23 to 60 inches; light gray (2.5Y 7/2) very cobbly coarse sandy loam, grayish brown (2.5Y 5/2) moist; massive; soft, very friable, nonsticky and nonplastic;

common very fine and fine roots in the upper part; few irregular pores; 25 percent gravel, 25 percent cobbles, and 5 percent stones; slightly acid.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 20 to 35 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent

A horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very stony or stony ashy sandy loam
Content of gravel—15 to 25 percent
Content of cobbles—10 to 20 percent
Content of stones—10 to 20 percent

Bw horizon:
Chroma—3 or 4 dry or moist
Texture—very cobbly or very gravelly ashy sandy loam
Content of gravel—20 to 30 percent
Content of cobbles—10 to 20 percent
Content of stones—5 to 10 percent

2C horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very cobbly or very gravelly coarse sandy loam
Content of gravel—25 to 35 percent
Content of cobbles—10 to 25 percent
Content of stones—5 to 10 percent

Chumstick Series

Soil depth: Shallow
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, shoulders, and ridges, generally on southerly aspects
Parent material: Mixed volcanic ash (10 to 20 inches) over bedrock
Slope: 15 to 65 percent
Elevation: 2,500 to 5,100 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 40 to 46 degrees F
Frost-free period: 90 to 130 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Lithic Ultic Haploxerolls

Typical Pedon

Chumstick very stony ashy sandy loam, in an area of Chumstick-Mineral-Rock outcrop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 3.5 miles south of Havillah, Washington; 2,500 feet north and 2,000 feet east of the southwest corner of sec. 19, T. 38 N., R. 29 E.; latitude 48 degrees 13 minutes 20 seconds north and longitude 119 degrees 13 minutes 20 seconds west.

A—0 to 5 inches; dark grayish brown (10YR 4/2) very stony ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine and few medium roots; few fine pores; 15 percent gravel, 10 percent cobbles, and 15 percent stones; neutral; clear smooth boundary.

Bw—5 to 15 inches; brown (10YR 5/3) very stony ashy sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common very fine and fine and few medium roots; few fine pores; 15 percent gravel, 10 percent cobbles, and 25 percent stones; neutral; clear wavy boundary.
2R—15 inches; schist.

Range in Characteristics

Depth to bedrock: 10 to 20 inches
Thickness of the material influenced by mixed volcanic ash: 10 to 20 inches
Thickness of the mollic epipedon: 7 to 15 inches
Content of rock fragments in the particle-size control section: 35 to 75 percent

A horizon:
Value—4 or 5 dry
Chroma—2 or 3 moist or dry
Texture—very stony or stony ashy sandy loam
Content of gravel—10 to 20 percent
Content of cobbles—5 to 20 percent
Content of stones—15 to 25 percent

Bw horizon:
Chroma—2 to 4 moist or dry
Texture—very cobbly, extremely stony, or very stony ashy sandy loam
Content of rock fragments—35 to 75 percent
Content of gravel—10 to 30 percent
Content of cobbles—10 to 15 percent
Content of stones—10 to 30 percent

Conconully Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Foothills and ground moraines
Position on landscape: Backslopes and shoulders
Parent material: Mixed volcanic ash (10 to 14 inches) over glacial till
Slope: 0 to 65 percent
Elevation: 1,500 to 3,000 feet
Mean annual precipitation: 11 to 15 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 110 to 150 days
Taxonomic classification: Coarse-loamy, mixed, superactive, mesic Vitrandic Haploxerolls

Typical Pedon

Conconully extremely stony ashy loam; Okanogan County Area, Washington; $SW^1/_4SW^1/_4$ sec. 23, T. 31 N., R. 22 E.; latitude 48 degrees 10 minutes 3 seconds north and longitude 120 degrees 3 minutes 18 seconds west.

A1—0 to 2 inches; dark grayish brown (10YR 4/2) extremely stony ashy loam, very dark brown (10YR 2/2) moist; weak thick platy structure that parts to weak fine granular; soft, very friable, nonsticky and nonplastic; many roots; 25 percent gravel, 20 percent cobbles, and 20 percent stones; neutral; abrupt smooth boundary.
A2—2 to 13 inches; dark grayish brown (10YR 4/2) stony ashy loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure; soft, very friable,

nonsticky and nonplastic; many roots; 10 percent gravel, 10 percent cobbles, and 10 percent stones; neutral; clear smooth boundary.
2Bw1—13 to 21 inches; brown (10YR 5/3) gravelly fine sandy loam, dark brown (10YR 3/3) moist; weak medium prismatic structure; soft, very friable, nonsticky and nonplastic; common roots; few fine tubular pores; 15 percent gravel and 5 percent cobbles; neutral; clear smooth boundary.
2Bw2—21 to 33 inches; pale brown (10YR 6/3) gravelly sandy loam, dark brown (10YR 4/3) moist; weak medium prismatic structure; slightly hard, very friable, nonsticky and nonplastic; common roots; few fine tubular pores; 15 percent gravel and 5 percent cobbles; neutral; clear smooth boundary.
2Cd—33 to 60 inches; light brownish gray (10YR 6/2) dense glacial till that crushes to gravelly sandy loam, dark grayish brown (10YR 4/2) moist; massive; 20 percent gravel and 10 percent cobbles; neutral.

Range in Characteristics

Depth to densic material: 26 to 40 inches
Thickness of the material influenced by mixed volcanic ash: 10 to 14 inches
Thickness of the mollic epipedon: 10 to 14 inches
Content of rock fragments in the particle-size control section: 15 to 35 percent

A1 horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3 dry or moist
Texture—ashy loam, extremely stony ashy loam, or gravelly ashy sandy loam
Content of gravel—5 to 25 percent
Content of cobbles—0 to 30 percent
Content of stones—0 to 30 percent
Content of boulders—0 to 2 percent

2Bw horizon:
Value—5 or 6 dry, 3 to 5 moist
Chroma—3 or 4 dry or moist
Texture—gravelly fine sandy loam, gravelly sandy loam, or gravelly coarse sandy loam
Content of rock fragments—15 to 35 percent

2Cd horizon:
Hue—10YR or 2.5Y
Value—5 to 7 dry, 3 to 6 moist
Chroma—1 to 4 dry or moist
Texture—gravelly sandy loam or gravelly coarse sandy loam
Content of rock fragments—15 to 35 percent

Coopmont Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, shoulders, and ridges
Parent material: Volcanic ash and pumice (25 to 38 inches) over colluvium and residuum from granodiorite
Slope: 15 to 65 percent
Elevation: 4,000 to 6,000 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days

Taxonomic classification: Ashy over loamy-skeletal, glassy over isotic Xeric Vitricryands

Typical Pedon

Coopmont paragravelly ashy fine sandy loam, in an area of Coopmont-Wocreek complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 1.5 miles northwest of Cooper Mountain; about 2,000 feet east and 3,000 feet south of the northwest corner of sec. 8, T. 29 N., R. 22 E.; latitude 48 degrees 1 minute 31 seconds north and longitude 120 degrees 6 minutes 35 seconds west.

Oi—1 inch to 0; slightly decomposed forest litter; abrupt smooth boundary.

A—0 to 3 inches; light gray (10YR 6/2) paragravelly ashy fine sandy loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many fine irregular pores; 25 percent pumice; slightly acid; clear wavy boundary.

C—3 to 4 inches; white (10YR 8/1) ashy fine sandy loam, light gray (10YR 6/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many fine irregular pores; slightly acid; clear wavy boundary.

Bw1—4 to 10 inches; brown (10YR 5/3) paragravelly ashy coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; many fine irregular pores; 30 percent pumice; slightly acid; clear wavy boundary.

Bw2—10 to 23 inches; brown (10YR 5/3) paragravelly ashy coarse sandy loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; many fine irregular pores; 30 percent pumice; slightly acid; gradual wavy boundary.

Bw3—23 to 29 inches; brown (10YR 5/3) paragravelly ashy coarse sandy loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; many fine irregular pores; 30 percent pumice; slightly acid; gradual wavy boundary.

2Bw4—29 to 37 inches; brown (10YR 5/3) extremely stony coarse sandy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; many fine irregular pores; 30 percent gravel, 20 percent cobbles, and 30 percent stones; slightly acid; clear wavy boundary.

2C—37 to 60 inches; brown (10YR 5/3) extremely gravelly sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; common fine irregular pores; 40 percent gravel, 10 percent cobbles, and 10 percent stones; slightly acid.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 25 to 38 inches

Coarse fragments: 15 to 35 percent paragravel in the volcanic ash layer and 40 to 80 percent rock fragments below the ash layer

A horizon:

Value—5 to 7 dry, 3 to 5 moist
Chroma—2 or 3 dry or moist
Content of pumice—15 to 35 percent

C horizon:

Value—6 to 8 dry, 5 or 6 moist

Chroma—1 or 2 dry or moist
Texture—ashy fine sandy loam or ashy very fine sandy loam
Content of pumice—0 to 10 percent

Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—paragravelly ashy coarse sandy loam or paragravelly ashy sandy loam
Content of pumice—15 to 35 percent

2Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—extremely stony coarse sandy loam or very stony sandy loam
Content of gravel—25 to 50 percent
Content of cobbles—15 to 30 percent
Content of stones—0 to 30 percent

2C horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—extremely stony sandy loam, very stony loamy coarse sand, cobbly sandy loam, or extremely gravelly sandy loam
Content of gravel—20 to 55 percent
Content of cobbles—10 to 30 percent
Content of stones—10 to 30 percent

Coxit Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, generally on southerly aspects
Parent material: Mixed volcanic ash (14 to 35 inches) over colluvium and residuum from metasedimentary rock
Slope: 15 to 65 percent
Elevation: 4,200 to 5,300 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 115 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts

Typical Pedon

Coxit gravelly ashy sandy loam, in an area of Coxit-Pelican complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 0.75 mile east of Muckamuck Mountain and 5.5 miles northwest of Conconully, Washington; Conconully West USGS topographic quadrangle; latitude 48 degrees 36 minutes 34 seconds north and longitude 119 degrees 50 minutes 15 seconds west.

Oe—1 inch to 0; moderately decomposed mat of organic matter consisting of needles, grasses, and twigs.
A1—0 to 1 inch; light brownish gray (10YR 6/2) gravelly ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, and medium and common coarse roots; many fine and medium tubular pores; 15 percent gravel and 5 percent cobbles; neutral; clear smooth boundary.

A2—1 to 7 inches; brown (10YR 5/3) gravelly ashy sandy loam, dark brown (10YR 3/3) moist; weak fine and medium granular structure; soft, friable, nonsticky and nonplastic; many very fine, fine, and medium and common coarse roots; common fine and medium tubular pores; 20 percent gravel and 5 percent cobbles; slightly acid; gradual wavy boundary.

Bw1—7 to 23 inches; brown (10YR 5/3) very cobbly ashy sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; soft, friable, nonsticky and nonplastic; many fine and medium and common coarse roots; common fine tubular pores; 25 percent gravel, 20 percent cobbles, and 5 percent stones; moderately acid; gradual wavy boundary.

Bw2—23 to 34 inches; yellowish brown (10YR 5/6) very cobbly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; many fine and medium and common coarse roots; common fine tubular pores; 25 percent gravel, 20 percent cobbles, and 5 percent stones; moderately acid; clear wavy boundary.

2C1—34 to 48 inches; light yellowish brown (2.5Y 6/4) very cobbly sandy loam, olive brown (2.5Y 4/4) moist; massive; slightly hard, friable, slightly sticky and nonplastic; common fine and medium and few coarse roots; few fine irregular pores; 20 percent gravel, 20 percent cobbles, and 5 percent stones; moderately acid; gradual wavy boundary.

2C2—48 to 60 inches; light yellowish brown (2.5Y 6/4) extremely cobbly sandy loam, olive brown (2.5Y 4/4) moist; massive; hard, friable, slightly sticky and nonplastic; few fine, medium, and coarse roots; few fine irregular pores; 30 percent gravel, 25 percent cobbles, and 5 percent stones; moderately acid.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 14 to 35 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent

A horizon:
- Value—5 or 6 dry
- Chroma—2 or 3 dry or moist
- Content of gravel—15 to 25 percent

Bw horizon:
- Value—5 or 6 dry, 3 or 4 moist
- Chroma—3 to 6 dry or moist
- Texture—very gravelly or very cobbly ashy sandy loam
- Content of gravel—20 to 30 percent
- Content of cobbles—5 to 20 percent
- Content of stones—0 to 5 percent

2C horizon:
- Hue—10YR or 2.5Y
- Texture—very gravelly, very cobbly, or extremely cobbly sandy loam
- Content of gravel—20 to 40 percent
- Content of cobbles—5 to 25 percent
- Content of stones—0 to 5 percent

Crocamp Series

Soil depth: Deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and shoulders, generally on southerly aspects

Parent material: Mixed volcanic ash (10 to 20 inches) over colluvium from granitic and metamorphic rock
Slope: 0 to 65 percent
Elevation: 5,200 to 7,810 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Loamy-skeletal, mixed, superactive Vitrandic Dystrocryepts

Typical Pedon

Crocamp very stony ashy sandy loam, in an area of Crocamp-Burget complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 15 miles southwest of Loomis, Washington; 2,200 feet east of the northeast corner of sec. 35, T. 38 N., R. 23 E.; latitude 48 degrees 45 minutes 20 seconds north and longitude 119 degrees 55 minutes 12 seconds west.

A—0 to 10 inches; dark grayish brown (10YR 4/2) very stony ashy sandy loam, black (10YR 2/1) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine and fine and common medium roots; common fine irregular pores; 15 percent gravel, 5 percent cobbles, and 20 percent stones; slightly acid; gradual wavy boundary.
AB—10 to 17 inches; brown (10YR 5/3) very cobbly ashy sandy loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine and fine and few medium roots; common fine irregular pores; 15 percent gravel, 20 percent cobbles, and 5 percent stones; slightly acid; clear wavy boundary.
2Bw—17 to 30 inches; light yellowish brown (10YR 6/4) very cobbly coarse sandy loam, dark yellowish brown (10YR 4/6) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; few fine irregular pores; 20 percent gravel, 25 percent cobbles, and 5 percent stones; moderately acid; clear wavy boundary.
2C—30 to 42 inches; pale brown (10YR 6/3) very cobbly coarse sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; 20 percent gravel, 30 percent cobbles, and 5 percent stones; moderately acid; abrupt wavy boundary.
2R—42 inches; granite.

Range in Characteristics

Depth to bedrock: 40 to 60 inches
Thickness of the material influenced by mixed volcanic ash: 10 to 20 inches
Content of rock fragments in the particle-size control section: 35 to 65 percent
Thickness of the umbric epipedon: 10 to 20 inches
Soil moisture regime: Xeric

A horizon:
Value—3 to 5 dry, 1 to 3 moist
Chroma—1 to 3 dry or moist
Texture—very stony ashy sandy loam or gravelly ashy sandy loam
Content of gravel—15 to 30 percent
Content of cobbles—5 to 20 percent
Content of stones—10 to 30 percent

AB horizon:
Value—3 to 6 dry, 2 to 4 moist
Chroma—2 to 4 dry or moist
Texture—very cobbly ashy sandy loam or very cobbly ashy coarse sandy loam

Content of gravel—15 to 30 percent
Content of cobbles—10 to 30 percent
Content of stones—0 to 15 percent

2Bw horizon:
Hue—7.5YR or 10YR
Value—4 to 6 dry, 3 to 6 moist
Chroma—3 to 6 dry or moist
Texture—very gravelly or very cobbly coarse sandy loam
Content of gravel—25 to 55 percent
Content of cobbles—10 to 30 percent
Content of stones—0 to 15 percent

2C horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—very cobbly or very stony coarse sandy loam
Content of gravel—25 to 55 percent
Content of cobbles—10 to 30 percent
Content of stones—0 to 15 percent

Cryaquepts

Soil depth: Very deep
Drainage class: Poorly drained
Landscape: Mountains
Position on landscape: Flood plains
Parent material: Volcanic ash (7 to 12 inches) over glaciofluvial deposits
Slope: 0 to 10 percent
Elevation: 5,000 to 6,800 feet
Mean annual precipitation: 50 to 70 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days
Taxonomic classification: Cryaquepts

Reference Pedon

Cryaquepts, in an area of Cryaquepts-Aquic Dystrocryepts complex, 0 to 25 percent slopes; Okanogan National Forest Area, Washington; in the Sawtooth Wilderness Area, Silver Lake Meadow; NW$^1/_4$SE$^1/_4$ sec. 3, T. 32 N., R. 19 E.; latitude 48 degrees 17 minutes 57 seconds north and longitude 120 degrees 27 minutes 15 seconds west.

Oi—0 to 1 inch; peat; slightly acid; abrupt smooth boundary.
Oe—1 to 2 inches; dark grayish brown (10YR 4/2) mucky peat, very dark brown (10YR 2/2) moist; slightly acid; abrupt smooth boundary.
Oa—2 to 4 inches; very dark gray (10YR 3/1) muck, black (10YR 2/1) moist; slightly acid; abrupt smooth boundary.
A—4 to 12 inches; very dark gray (10YR 3/1) ashy silt loam, black (10YR 2/1) moist; weak fine subangular blocky structure; soft, loose, slightly sticky and slightly plastic; common fine and few coarse roots; very strongly acid; clear wavy boundary.
2Bw1—12 to 20 inches; light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (2.5Y 4/2) moist; weak fine subangular blocky structure; soft, loose, slightly sticky and slightly plastic; common fine and medium roots; moderately acid; clear wavy boundary.
2Bw2—20 to 26 inches; yellow (10YR 7/8) fine sandy loam, yellowish brown (10YR 5/8) moist; massive; common fine prominent dark grayish brown (10YR 4/2, moist)

redoximorphic depletions; loose, nonsticky and nonplastic; few very fine and fine roots; moderately acid; clear wavy boundary.

2Bw3—26 to 60 inches; light brownish gray (2.5Y 6/2) fine sandy loam, dark grayish brown (2.5Y 4/2) moist; many fine prominent yellow (10YR 7/6) and yellowish brown (10YR 5/6) redoximorphic concentrations; massive; loose, nonsticky and nonplastic; few very fine roots; moderately acid.

Range in Characteristics

Depth to redoximorphic features: 10 to 20 inches from the surface of the mineral soil
Seasonal high water table: Present in spring, summer, and fall
Thickness of the material influenced by volcanic ash: The upper 7 to 12 inches of the mineral soil
Depth to mineral soil: 4 to 12 inches

Oe horizon:
Value—3 or 4 dry, 2 or 3 moist
Chroma—1 or 2 dry or moist

Oa horizon:
Value—2 or 3 dry
Chroma—1 or 2 dry or moist

A horizon:
Value—3 or 4 dry, 2 or 3 moist
Chroma—0 to 2 moist

Bw horizon:
Hue—2.5Y or 10YR
Value—5 to 8 dry, 4 or 5 moist
Chroma—2 to 8 dry or moist

Cryaquolls

Soil depth: Very deep
Drainage class: Poorly drained or somewhat poorly drained
Landscape: Mountains
Position on landscape: Drainage bottoms and depressional areas on outwash plains and outwash terraces
Parent material: Mixed alluvium over glacial till and glacial outwash
Slope: 0 to 5 percent
Elevation: 4,400 to 5,100 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Cryaquolls

Reference Pedon

Cryaquolls, in an area of Vitrandic Eutrocryepts-Cryaquolls complex, 0 to 5 percent slopes; Okanogan National Forest Area, Washington; about 5 miles northwest of Wauconda, Washington; 5 miles southwest of Bonaparte Lake; 1,300 feet west and 1,450 feet north of the southeast corner of sec. 35, T. 38 N., R. 29 E.; latitude 48 degrees 44 minutes 40 seconds north and longitude 119 degrees 7 minutes 33 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles, twigs, and grass; clear smooth boundary.

A1—0 to 7 inches; brown (10YR 5/3) loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine and common medium and coarse roots; common very fine and fine pores; neutral; clear wavy boundary.

A2—7 to 15 inches; grayish brown (10YR 5/2) loam, black (10YR 2/1) moist; moderate medium subangular structure parting to moderate fine and medium granular; slightly hard, firm, moderately sticky and moderately plastic; many very fine and fine and common medium and coarse roots; common very fine and fine pores; neutral; gradual wavy boundary.

Bg—15 to 19 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 5/2) moist; few fine distinct yellowish brown (10YR 5/6) redoximorphic concentrations; moderate medium subangular blocky structure; soft, friable, slightly sticky and nonplastic; many very fine and fine and few medium roots; few fine pores; neutral; clear wavy boundary.

2Cg1—19 to 29 inches; light gray (2.5Y 7/2) sandy loam, grayish brown (2.5Y 5/2) moist; common fine and medium distinct yellowish brown (10YR 5/6) redoximorphic concentrations; massive; slightly hard, friable, nonsticky and nonplastic; few very fine roots; 5 percent gravel; slightly acid; clear wavy boundary.

2Cg2—29 to 38 inches; light yellowish brown (10YR 6/4) gravelly loamy coarse sand, yellowish brown (10YR 5/6) moist; many fine and medium prominent grayish brown (10YR 5/2) redoximorphic depletions; single grain; loose, nonsticky and nonplastic; 15 percent gravel; neutral; clear wavy boundary.

2Cg3—38 to 60 inches; pale yellow (2.5Y 7/3) gravelly fine sandy loam, grayish brown (2.5Y 5/2) moist; many medium prominent yellowish brown (10YR 5/6) redoximorphic concentrations; massive; slightly hard, friable, slightly sticky and nonplastic; 15 percent gravel and 5 percent cobbles; slightly acid.

Range in Characteristics

Depth to glacial till or glacial outwash: 19 to 40 inches
Depth to redoximorphic features: 10 to 20 inches
Content of rock fragments in the particle-size control section: 5 to 30 percent
Thickness of the mollic epipedon: 10 to 20 inches
Seasonal high water table: Present in spring and summer

A horizon:
- Value—4 or 5 dry, 2 or 3 moist
- Chroma—1 to 3 dry or moist
- Content of gravel—0 to 15 percent

Bg horizon:
- Hue—2.5Y or 10YR
- Value—5 to 7 dry, 5 or 6 moist
- Texture—silt loam, gravelly loam, or gravelly fine sandy loam
- Content of gravel—0 to 30 percent
- Content of cobbles—0 to 5 percent
- Redoximorphic concentrations—value of 4 or 5 and chroma of 4 to 6

2Cg horizon:
- Hue—2.5Y or 10YR
- Value—5 to 7 dry, 5 or 6 moist
- Chroma—2 to 6 dry or moist
- Texture—sandy loam, gravelly fine sandy loam, or gravelly loamy coarse sand
- Content of gravel—5 to 25 percent
- Content of cobbles—0 to 5 percent
- Redoximorphic concentrations—value of 4 or 5 and chroma of 4 to 6

Cryofluvents

Soil depth: Very deep
Drainage class: Poorly drained or somewhat poorly drained
Landscape: Mountains
Position on landscape: Glacial-trough valley bottoms, flood plains, and low stream terraces
Parent material: Mixed alluvium
Slope: 0 to 5 percent
Elevation: 2,800 to 4,800 feet
Mean annual precipitation: 25 to 60 inches
Mean annual air temperature: 36 to 42 degrees F
Frost-free period: 50 to 90 days
Taxonomic classification: Cryofluvents

Reference Pedon

Cryofluvents, in an area of Cryofluvents, 0 to 5 percent slopes; Okanogan National Forest Area, Washington; about 22 miles north of Winthrop, Washington, 3 miles north of North Twentymile Peak; Coleman Peak USGS topographic quadrangle; latitude 48 degrees 47 minutes 45 seconds north and longitude 120 degrees 32 minutes 21 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles, twigs, moss, and grass.
A1—0 to 3 inches; grayish brown (10YR 5/2) loam, dark brown (7.5YR 3/2) moist; moderate fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium roots; common fine pores; neutral; clear smooth boundary.
A2—3 to 7 inches; light brownish gray (10YR 6/2) sandy loam, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; common fine pores; 5 percent gravel; neutral; gradual smooth boundary.
C1—7 to 24 inches; light brownish gray (10YR 6/2) sandy loam with a few thin strata of loamy sand, brown (7.5YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine, fine, medium, and coarse roots; common fine pores; 10 percent gravel; neutral; gradual smooth boundary.
C2—24 to 48 inches; light gray (10YR 7/2) sandy loam, dark brown (10YR 3/3) moist; many medium and large prominent brownish yellow (10YR 6/6) redoximorphic concentrations; massive; soft, very friable, nonsticky and nonplastic; common fine and medium roots; few fine pores; 10 percent gravel; slightly acid; gradual smooth boundary.
C3—48 to 60 inches; light gray (10YR 7/2) sandy loam, grayish brown (10YR 5/2) moist; common medium and large prominent brownish yellow (10YR 6/6) redoximorphic concentrations; massive; soft, very friable, nonsticky and nonplastic; few fine pores; 10 percent gravel; neutral.

Range in Characteristics

Depth to stratified sandy, loamy, and gravelly material: 7 to 30 inches
Depth to redoximorphic features: 20 to 40 inches
Content of rock fragments in the particle-size control section: 5 to 60 percent
Seasonal high water table: Present in spring

A horizon:
Value—4 to 7 dry, 2 to 4 moist
Chroma—2 to 4 dry or moist
Texture—loam or sandy loam
Content of gravel—0 to 30 percent

C horizon:
Value—5 to 7 dry
Chroma—2 to 4 dry or moist
Texture—stratified sandy loam to very gravelly coarse sand
Content of gravel—5 to 60 percent
Content of cobbles—0 to 10 percent

Cryohemists

Soil depth: Very deep
Drainage class: Very poorly drained
Landscape: Mountains
Position on landscape: Valley bottoms
Parent material: Organic soil material over alluvium and glacial till
Slope: 0 to 5 percent
Elevation: 5,000 to 6,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 60 to 80 days
Taxonomic classification: Cryohemists

Reference Pedon

Cryohemists, in an area of Histic Cryaquepts-Cryohemists complex, 0 to 10 percent slopes; Okanogan National Forest Area, Washington; about 2 miles north of Tiffany Mountain; 500 feet east and 100 feet south of the northwest corner of sec. 10, T. 37 N., R. 23 E.; latitude 48 degrees 43 minutes 36 seconds north and longitude 119 degrees 56 minutes 47 seconds west.

Oe—0 to 14 inches; very dark gray (10YR 3/1) mucky peat, black (10YR 2/1) moist; about 50 percent fiber, 25 percent rubbed; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, and medium roots; slightly acid; clear smooth boundary.
Oa—14 to 19 inches; very dark gray (10YR 3/1) muck, black (10YR 2/1) moist; 45 percent fiber, 15 percent rubbed; massive; soft, very friable, nonsticky and nonplastic; many very fine, fine, and medium roots; slightly acid; abrupt smooth boundary.
2Cg1—19 to 26 inches; light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; slightly acid; abrupt smooth boundary.
2Cg2—26 to 33 inches; gray (5Y 6/1) gravelly sandy loam, gray (5Y 5/1) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; 15 percent gravel; slightly acid; abrupt smooth boundary.
3Cg3—33 to 60 inches; gray (10YR 6/1) very gravelly loamy sand, gray (10YR 5/1) moist; single grain; loose, nonsticky and nonplastic; 40 percent gravel; slightly acid.

Range in Characteristics

Depth to mineral soil material: 16 to 40 inches
Seasonal high water table: Present throughout the year

Oe horizon:
Value—2 or 3 dry
Chroma—1 or 2 dry or moist

Oa horizon:
Value—2 to 4 dry, 2 or 3 moist
Chroma—1 or 2 dry or moist

2Cg horizon:
Hue—10YR or 5Y
Value—5 to 7 dry, 3 to 5 moist
Chroma—1 or 2 dry or moist
Texture—fine sandy loam, gravelly sandy loam, and very gravelly sandy loam
Content of gravel—0 to 40 percent

3Cg horizon:
Hue—10YR or 5Y
Value—5 to 7 dry, 3 to 5 moist
Chroma—1 or 2 dry or moist
Texture—very gravelly loamy sand, gravelly loamy sand, or very gravelly sandy loam
Content of gravel—15 to 40 percent

Cubhill Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Foothills
Position on landscape: Backslopes and footslopes having a southerly aspect
Parent material: Mixed volcanic ash (12 to 18 inches) over glacial till from sedimentary and volcanic rock
Slope: 15 to 35 percent
Elevation: 2,900 to 4,500 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 110 to 140 days
Taxonomic classification: Loamy-skeletal, mixed, superactive, mesic Vitrandic Argixerolls

Typical Pedon

Cubhill gravelly ashy loam, in an area of Cubhill-Johntom complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 6.5 miles north of Winthrop, Washington; 980 feet east and 2,650 feet south of the northwest corner of sec. 29, T. 36 N., R. 21 E.; latitude 48 degrees 35 minutes 30 seconds north and longitude 120 degrees 14 minutes 44 seconds west.

A1—0 to 9 inches; dark grayish brown (10YR 4/2) gravelly ashy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common medium irregular pores; 20 percent gravel; neutral; gradual wavy boundary.
A2—9 to 18 inches; dark grayish brown (10YR 4/2) gravelly ashy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; common medium irregular pores; 20 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
2AB—18 to 25 inches; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium and fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common fine irregular pores; 25 percent gravel and 10 percent cobbles; neutral; clear wavy boundary.
2Bt1—25 to 36 inches; brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, friable, slightly

sticky and slightly plastic; few very fine and fine roots; few fine irregular pores; few discontinuous faint clay films on faces of peds and in pores; 30 percent gravel and 10 percent cobbles; neutral; clear wavy boundary.

2Bt2—36 to 60 inches; pale brown (10YR 6/3) very gravelly clay loam, brown (10YR 5/3) moist; massive; very hard, friable, moderately sticky and slightly plastic; few very fine roots; few fine irregular pores; few discontinuous faint clay films on faces of peds and in pores; 35 percent gravel and 10 percent cobbles; neutral.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 12 to 18 inches
Content of rock fragments in the particle-size control section: 35 to 50 percent
Thickness of the mollic epipedon: 15 to 25 inches

A horizon:
Value—3 or 4 dry, 2 or 3 moist
Chroma—2 or 3 dry or moist
Content of gravel—15 to 20 percent
Content of cobbles—0 to 5 percent

2AB horizon:
Value—4 or 5 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly or gravelly loam
Content of gravel—20 to 30 percent
Content of cobbles—5 to 10 percent

2Bt horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—very gravelly clay loam, very gravelly loam, or very gravelly sandy clay loam
Content of gravel—30 to 40 percent
Content of cobbles—5 to 10 percent

Devore Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, shoulders, and broad ridges, generally on southerly aspects
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from granitic and metamorphic rock
Slope: 0 to 65 percent
Elevation: 4,500 to 7,450 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 42 degrees F
Frost-free period: 60 to 90 days
Taxonomic classification: Loamy-skeletal, isotic Andic Eutrocryepts

Typical Pedon

Devore stony ashy sandy loam, in an area of Myerscreek-Devore complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 13 miles northwest of Conconully, Washington; 1,600 feet west and 1,000 feet south of the northeast corner of sec. 16, T. 37 N., R. 23 E.; latitude 48 degrees 42 minutes 36 seconds north and longitude 119 degrees 57 minutes 24 seconds west.

Oe—3 inches to 0; moderately decomposed needles, leaves, and twigs; abrupt smooth boundary.
C—0 to 1 inch; light gray (10YR 7/2) stony ashy sandy loam, grayish brown (10YR 5/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine irregular pores; 5 percent gravel, 5 percent cobbles, and 10 percent stones; slightly acid; clear wavy boundary.
2A—1 to 4 inches; brown (10YR 5/3) very stony ashy fine sandy loam, dark brown (10YR 3/3) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine irregular pores; 15 percent gravel, 20 percent cobbles, and 20 percent stones; slightly acid; clear wavy boundary.
2Bw—4 to 11 inches; light yellowish brown (10YR 6/4) very stony ashy fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and few medium roots; common very fine and fine irregular pores; 10 percent gravel, 20 percent cobbles, and 25 percent stones; moderately acid; gradual wavy boundary.
3C1—11 to 23 inches; pale brown (10YR 6/3) extremely stony coarse sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; common fine irregular pores; 15 percent gravel, 20 percent cobbles, and 30 percent stones; moderately acid; gradual wavy boundary.
3C2—23 to 32 inches; very pale brown (10YR 7/3) extremely stony coarse sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and medium roots; few fine irregular pores; 15 percent gravel, 20 percent cobbles, and 35 percent stones; moderately acid; gradual wavy boundary.
3R—32 inches; granite.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 40 to 80 percent
Soil moisture regime: Xeric
Note: Not all pedons have a C horizon.

C horizon (where present):
Texture—stony ashy fine sandy loam, stony ashy silt loam, or stony ashy sandy loam

2A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—very stony ashy sandy loam or very stony ashy fine sandy loam
Content of gravel—5 to 20 percent
Content of cobbles—5 to 20 percent
Content of stones—10 to 20 percent

2Bw horizon:
Value—3 or 4 moist
Chroma—2 to 4 dry or moist
Texture—very stony ashy sandy loam or very stony ashy fine sandy loam
Content of gravel—10 to 20 percent
Content of cobbles—15 to 25 percent
Content of stones—10 to 25 percent

3C horizon:
Value—5 to 7 dry, 4 or 5 moist
Chroma—2 to 4 dry or moist
Texture—extremely stony coarse sandy loam, very stony coarse sandy loam, or very cobbly sandy loam
Content of gravel—15 to 25 percent
Content of cobbles—10 to 30 percent
Content of stones—10 to 35 percent

Dodd Series

Soil depth: Shallow
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Shoulders and ridges
Parent material: Mixed volcanic ash (7 to 11 inches) over residuum and colluvium from granitic rock
Slope: 15 to 35 percent
Elevation: 4,900 to 6,200 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days
Taxonomic classification: Sandy-skeletal, isotic Lithic Cryorthents

Typical Pedon

Dodd very gravelly ashy sandy loam, in an area of Wellsfar-Dodd-Rock outcrop complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 14 miles west of Loomis, Washington; 500 feet east and 800 feet north of the southwest corner of sec. 27, T. 39 N., R. 23 E.; latitude 48 degrees 50 minutes 41 seconds north and longitude 119 degrees 56 minutes 47 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, leaves, and twigs; clear smooth boundary.
A—0 to 4 inches; pale brown (10YR 6/3) very gravelly ashy sandy loam, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine tubular pores; 35 percent gravel; slightly acid; clear smooth boundary.
Bw—4 to 8 inches; light yellowish brown (10YR 6/4) very gravelly ashy coarse sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; few fine irregular pores; 45 percent gravel; slightly acid; clear wavy boundary.
2C—8 to 16 inches; light yellowish brown (10YR 6/4) extremely gravelly loamy coarse sand, yellowish brown (10YR 5/6) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; 65 percent gravel and 5 percent cobbles; moderately acid; gradual wavy boundary.
2R—16 inches; granite.

Range in Characteristics

Depth to bedrock: 10 to 20 inches
Thickness of the material influenced by mixed volcanic ash: 7 to 11 inches
Content of rock fragments in the particle-size control section: 50 to 70 percent
Soil moisture regime: Xeric

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Content of gravel—35 to 45 percent
Content of cobbles—0 to 5 percent

Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Texture—very gravelly ashy sandy loam or very gravelly ashy coarse sandy loam
Content of gravel—35 to 50 percent
Content of cobbles—0 to 5 percent

2C horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—3 or 4 dry, 4 to 6 moist
Content of gravel—55 to 70 percent
Content of cobbles—5 to 10 percent

Doe Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes
Parent material: Volcanic ash (20 to 35 inches) over granitic colluvium over glacial outwash or ablation till
Slope: 35 to 65 percent
Elevation: 2,800 to 4,700 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 42 to 46 degrees F
Frost-free period: 95 to 120 days
Taxonomic classification: Ashy-skeletal, glassy, frigid Typic Vitrixerands

Typical Pedon

Doe very stony ashy coarse sandy loam, in an area of Doe-Wellie-Rock outcrop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 22 miles north of Winthrop, Washington, and about 3 miles northwest of North Twentymile Peak; Coleman Peak USGS topographic quadrangle; latitude 48 degrees 47 minutes 25 seconds north and longitude 120 degrees 6 minutes 18 seconds west.

Oe—3 inches to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.
A—0 to 8 inches; light gray (10YR 7/2) very stony ashy coarse sandy loam, dark grayish brown (10YR 4/2) moist; moderate medium granular structure; soft, very friable, nonsticky and nonplastic; nonsmeary; many fine, common medium, and few coarse roots; many fine irregular pores; 20 percent gravel, 10 percent cobbles, and 25 percent stones; slightly acid; clear wavy boundary.
Bw—8 to 24 inches; brownish yellow (10YR 6/6) very cobbly ashy coarse sandy loam, dark yellowish brown (10YR 4/6) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; nonsmeary; many fine, common medium, and few coarse roots; many fine irregular pores; 30 percent gravel and 20 percent cobbles; moderately acid; clear wavy boundary.
2C—24 to 60 inches; light gray (10YR 7/2) very cobbly loamy coarse sand, brown (10YR 5/3) moist; single grain; loose, nonsticky and nonplastic; few fine, medium,

and coarse roots; many fine and medium irregular pores; 30 percent gravel and 20 percent cobbles; moderately acid.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 20 to 35 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent

A horizon:
Value—5 to 7 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Content of rock fragments—35 to 60 percent
Content of gravel—15 to 30 percent
Content of cobbles—5 to 10 percent
Content of stones—15 to 25 percent

Bw horizon:
Value—6 or 7 dry
Chroma—3 to 6 dry or moist
Texture—very gravelly ashy sandy loam or very cobbly ashy coarse sandy loam
Content of gravel—25 to 30 percent
Content of cobbles—10 to 25 percent
Content of stones—0 to 2 percent

2C horizon:
Value—6 or 7 dry
Texture—very gravelly or very cobbly loamy coarse sand
Content of gravel—25 to 35 percent
Content of cobbles—10 to 25 percent
Content of stones—0 to 2 percent

Donavan Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Foothills and mountains
Position on landscape: Toeslopes, backslopes, and footslopes
Parent material: Mixed volcanic ash (7 to 15 inches) over glacial till
Slope: 3 to 65 percent
Elevation: 1,800 to 4,500 feet
Mean annual precipitation: 14 to 20 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 90 to 130 days
Taxonomic classification: Coarse-loamy, isotic, mesic Vitrandic Haploxerolls

Typical Pedon

Donavan stony ashy loam; Okanogan County Area, Washington; about 8 miles west-southwest of Wauconda, Washington; 2,000 feet east and 2,000 feet south of the northwest corner of sec. 16, T. 37 N., R. 29 E.; latitude 48 degrees 12 minutes 24 seconds north and longitude 119 degrees 10 minutes 48 seconds west.

Oi—1 inch to 0; slightly decomposed mat of needles, twigs, and grass; abrupt smooth boundary.
A—0 to 6 inches; very dark grayish brown (10YR 3/2) stony ashy loam, black (10YR 2/1) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; common fine

and very fine tubular pores; 10 percent gravel, 5 percent cobbles, and 5 percent stones; neutral; clear smooth boundary.

Bw1—6 to 10 inches; dark grayish brown (10YR 4/2) gravelly ashy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common very fine and fine tubular pores; 15 percent gravel and 5 percent cobbles; neutral; clear smooth boundary.

Bw2—10 to 15 inches; brown (10YR 5/3) gravelly ashy sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common very fine and fine irregular pores; 20 percent gravel; neutral; clear smooth boundary.

2BC—15 to 26 inches; pale brown (10YR 6/3) gravelly sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine and medium roots; few fine irregular pores; many fine and medium distinct dark yellowish brown (10YR 4/4, moist) stains; 20 percent gravel; neutral; gradual wavy boundary.

2Cd1—26 to 33 inches; light brownish gray (2.5Y 6/2) gravelly sandy loam, grayish brown (10YR 5/2) moist; massive; hard, friable, nonsticky and nonplastic; few very fine roots; few fine and medium distinct brown (10YR 4/3, moist) stains; 15 percent gravel and 5 percent cobbles; neutral; gradual wavy boundary.

2Cd2—33 to 60 inches; light brownish gray (2.5Y 6/2) gravelly sandy loam, grayish brown (2.5Y 5/2) moist; massive; hard, friable, nonsticky and nonplastic; 15 percent gravel and 5 percent cobbles; neutral.

Range in Characteristics

Depth to densic material: 20 to 40 inches
Thickness of the material influenced by mixed volcanic ash: 7 to 15 inches
Content of rock fragments in the particle-size control section: 10 to 35 percent
Thickness of the mollic epipedon: 7 to 18 inches

A horizon:
- Value—3 to 5 dry, 2 or 3 moist
- Chroma—1 to 3 dry or moist
- Texture—ashy loam, ashy sandy loam, stony ashy loam, or stony ashy sandy loam
- Content of gravel—0 to 10 percent
- Content of cobbles—0 to 5 percent
- Content of stones—0 to 10 percent

Bw horizon:
- Value—4 or 5 dry, 3 or 4 moist
- Chroma—2 or 3 dry or moist
- Texture—ashy loam, gravelly ashy sandy loam, or gravelly ashy loam
- Content of gravel—5 to 20 percent
- Content of cobbles—0 to 5 percent

2BC horizon:
- Value—6 or 7 dry, 4 or 5 moist
- Chroma—2 or 3 dry or moist
- Content of gravel—10 to 20 percent

2Cd horizon:
- Hue—10YR or 2.5Y
- Value—6 or 7 dry, 4 or 5 moist
- Chroma—2 or 3 dry or moist
- Content of gravel—15 to 20 percent
- Content of cobbles—0 to 5 percent

Edds Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and footslopes
Parent material: Volcanic ash (21 to 31 inches) over glacial till
Slope: 15 to 50 percent
Elevation: 2,500 to 5,000 feet
Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 37 to 39 degrees F
Frost-free period: 80 to 90 days
Taxonomic classification: Ashy over loamy, glassy over isotic Humic Xeric Vitricryands

Typical Pedon

Edds gravelly ashy loam; North Ferry Area, Washington; Block Floor Cabin area, 20 yards north of a road, 300 yards east of a spring, in the Colville National Forest; NE¼SW¼ sec. 7, T. 35 N., R. 34 E.; latitude 48 degrees 32 minutes 57 seconds north and longitude 118 degrees 36 minutes 3 seconds west.

A—0 to 6 inches; dark gray (10YR 4/1) gravelly ashy loam, black (10YR 2/1) moist; weak fine and medium granular and medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; many fine roots; 15 percent fine gravel; slightly acid (pH 6.1); abrupt smooth boundary.

AB—6 to 12 inches; grayish brown (10YR 5/2) gravelly ashy loam, very dark brown (10YR 2/2) moist; moderate fine and medium subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; many fine roots; 15 percent fine gravel; slightly acid; clear wavy boundary.

Bw1—12 to 17 inches; very pale brown (10YR 7/3) gravelly ashy loam, dark brown (10YR 4/3) moist; moderate medium and fine subangular blocky structure; slightly hard, firm, moderately sticky and slightly plastic; many fine roots; 15 percent fine gravel; moderately acid; clear wavy boundary.

Bw2—17 to 24 inches; light yellowish brown (10YR 6/4) ashy clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium and coarse angular blocky structure; slightly hard, firm, moderately sticky and slightly plastic; many fine roots; many tubular pores; 5 percent gravel; slightly acid (pH 6.3); clear wavy boundary.

2C1—24 to 28 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; single grain; loose, friable, slightly sticky and nonplastic; many fine roots; slightly acid; clear wavy boundary.

3C2—28 to 40 inches; light gray (10YR 7/2) gravelly loamy coarse sand, grayish brown (10YR 5/2) moist; massive; hard, firm, nonsticky and nonplastic; many tubular pores; many clean sand grains; 25 percent gravel; slightly acid; clear wavy boundary.

4C3—40 to 60 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; strong medium platy structure; hard, very firm, moderately sticky and moderately plastic; sand grains bridged with clay; slightly acid.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 21 to 31 inches
Rock fragments: The upper part of the control section contains more than 60 percent pyroclastic materials and 5 to 35 percent rock fragments.
Thickness of the umbric epipedon: 10 to 15 inches

A horizon:
Value—4 or 5 dry
Chroma—1 or 2 dry or moist

AB horizon:
Value—4 or 5 dry
Chroma—1 or 2 dry or moist
Texture—gravelly ashy loam or ashy loam

Bw horizon:
Value—6 or 7 dry
Chroma—3 or 4 dry or moist
Texture—ashy loam, gravelly ashy clay loam, gravelly ashy loam, or ashy clay loam

2C, 3C, and 4C horizons:
Value—5 to 7 dry
Texture—stratified silt loam, loam sandy loam, and loamy coarse sand; gravelly in most pedons
Content of gravel—0 to 20 percent

Enson Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Footslopes and backslopes
Parent material: Mixed volcanic ash (12 to 16 inches) over glacial till
Slope: 15 to 35 percent
Elevation: 2,400 to 4,000 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Coarse-loamy, isotic, frigid Vitrandic Haploxerepts

Typical Pedon

Enson ashy sandy loam, in an area of Enson ashy sandy loam, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 500 feet east and 2,300 feet south of the northwest corner of sec. 24, T. 33 N., R. 23 E.; latitude 48 degrees 20 minutes 43 seconds north and longitude 119 degrees 54 minutes 19 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.
A—0 to 3 inches; light brownish gray (10YR 6/2) ashy sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; common very fine and fine tubular pores; 5 percent gravel; slightly acid; clear wavy boundary.
Bw1—3 to 6 inches; pale brown (10YR 6/3) ashy sandy loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common very fine and fine tubular pores; 5 percent gravel; slightly acid; clear wavy boundary.
Bw2—6 to 15 inches; pale brown (10YR 6/3) ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common very fine and fine tubular pores; 5 percent gravel; slightly acid; clear smooth boundary.
2C—15 to 33 inches; light gray (10YR 7/2) gravelly sandy loam, light brownish gray (10YR 6/2) moist; massive; soft, very friable, nonsticky and nonplastic; common

very fine and fine and few medium roots; common very fine and fine irregular pores; common medium and coarse masses of dark yellowish brown (10YR 4/4, moist) volcanic ash; 15 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.

2Cd1—33 to 44 inches; light gray (10YR 7/2) gravelly loamy sand, light brownish gray (10YR 6/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine roots; few very fine irregular pores; 25 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.

2Cd2—44 to 60 inches; light yellowish brown (10YR 6/4) very gravelly loamy sand, yellowish brown (10YR 5/4) moist; massive; hard, very friable, nonsticky and nonplastic; few very fine roots; thin layers of yellowish brown (10YR 5/6 moist) stains; 30 percent gravel and 5 percent cobbles; slightly acid.

Range in Characteristics

Depth to densic material: 20 to 40 inches
Thickness of the material influenced by mixed volcanic ash: 12 to 16 inches
Content of rock fragments in the particle-size control section: 15 to 35 percent

A horizon:
Value—3 or 4 moist
Chroma—2 or 3 dry or moist
Content of gravel—0 to 10 percent

Bw horizon:
Value—3 or 4 moist
Chroma—3 or 4 dry or moist
Texture—ashy sandy loam or gravelly ashy sandy loam
Content of gravel—5 to 20 percent

2C horizon:
Value—6 or 7 dry, 5 or 6 moist
Chroma—2 or 3 dry or moist
Content of gravel—15 to 25 percent
Content of cobbles—0 to 5 percent

2Cd horizon:
Hue—10YR or 2.5Y
Value—6 or 7 dry, 5 or 6 moist
Chroma—2 to 4 dry or moist
Texture—very gravelly or gravelly loamy sand
Content of gravel—15 to 30 percent
Content of cobbles—0 to 5 percent

Farway Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and footslopes
Parent material: Volcanic ash (16 to 30 inches) over colluvium and glacial till from sedimentary and volcanic rock
Slope: 15 to 65 percent
Elevation: 2,400 to 4,900 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 115 days

Taxonomic classification: Ashy over loamy-skeletal, glassy over isotic, frigid Typic Vitrixerands

Typical Pedon

Farway gravelly ashy sandy loam, in an area of Veridge-Farway complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 7 miles west-northwest of Winthrop, Washington; about 2,200 feet west and 300 feet south of the northeast corner of sec. 27, T. 35 N., R. 20 E.; latitude 48 degrees 30 minutes 43 seconds north and longitude 120 degrees 19 minutes 28 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.

A—0 to 4 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, brown (10YR 4/3) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine roots; common fine and very fine irregular pores; 15 percent gravel; neutral; clear wavy boundary.

Bw1—4 to 9 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and few medium roots; common fine and very fine irregular pores; 15 percent gravel; neutral; gradual wavy boundary.

Bw2—9 to 20 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine and few medium roots; common fine and very fine irregular pores; 15 percent gravel and 5 percent cobbles; neutral; gradual wavy boundary.

2C—20 to 60 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots in the upper part; common very fine and fine irregular pores; 40 percent subangular pebbles and 10 percent subangular cobbles; neutral.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 16 to 30 inches

Content of rock fragments in the particle-size control section: 10 to 25 percent in the upper part and 35 to 65 percent in the lower part

Note: Some pedons have a thin C horizon directly below the organic layer. The C horizon consists of 450 to 500 year old “W” ash from Mount Saint Helens.

A horizon:

Value—4 to 6 dry, 2 to 4 moist
Chroma—2 or 3 dry or moist

Bw horizon:

Chroma—3 or 4 moist
Texture—gravelly ashy sandy loam or ashy sandy loam
Content of gravel—10 to 20 percent
Content of cobbles—0 to 5 percent

2C horizon:

Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly, very cobbly, or extremely gravelly sandy loam
Content of gravel—30 to 55 percent
Content of cobbles—5 to 30 percent
Content of stones—0 to 10 percent

Fears Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Upper backslopes
Parent material: Volcanic ash (60 inches) mixed with colluvium from granitic rocks
Slope: 50 to 90 percent
Elevation: 4,500 to 5,600 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 80 days
Taxonomic classification: Ashy-skeletal, glassy Xeric Vitricryands

Typical Pedon

Fears gravelly ashy sandy loam, in an area of Fears-Rock outcrop complex, 50 to 90 percent slopes; Okanogan National Forest Area, Washington; in the Okanogan National Forest; sec. 16, T. 29 N., R. 22 E.; latitude 48 degrees 1 minute 2 seconds north and longitude 120 degrees 4 minutes 50 seconds west.

Oe—1 inch to 0; moderately decomposed mat of forest litter; abrupt smooth boundary.
A/C—0 to 4 inches; brown (10YR 5/3) gravelly ashy sandy loam, dark brown (10YR 3/3) moist, over ashy fine sandy loam (10YR 7/2), dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure over weak fine and medium granular; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; many fine irregular pores; 25 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.
Bw1—4 to 14 inches; brown (10YR 5/3) very gravelly ashy sandy loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; common fine irregular pores; 40 percent gravel and 10 percent cobbles; slightly acid; gradual wavy boundary.
Bw2—14 to 33 inches; yellowish brown (10YR 5/4) extremely gravelly ashy sandy loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine irregular pores; 40 percent gravel, 15 percent cobbles, and 5 percent stones; slightly acid; gradual wavy boundary.
Bw3—33 to 40 inches; brown (10YR 5/3) extremely cobbly ashy coarse sandy loam, dark yellowish brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine irregular pores; 40 percent gravel, 15 percent cobbles, and 10 percent stones; slightly acid; clear irregular boundary.
C—40 to 60 inches; yellowish brown (10YR 5/4) extremely gravelly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine, fine, and medium roots; few fine irregular pores; 40 percent gravel, 15 percent cobbles, and 15 percent stones; slightly acid.

Range in Characteristics

Thickness of volcanic ash mixed with colluvium from granite: 60 or more inches
Rock fragments: 35 to 80 percent
Pumice fragments: 0 to 10 percent

A/C horizon:
Value—5 to 7 dry, 3 or 4 moist
Chroma—1 to 3 dry or moist

Texture—gravelly ashy sandy loam, ashy sandy loam, or ashy fine sandy loam
Content of gravel—10 to 30 percent
Content of cobbles—0 to 10 percent

Bw horizon:
Value—4 or 5 dry, 3 or 4 moist
Chroma—2 to 4 dry or moist
Texture—very gravelly, extremely gravelly, or very cobbly ashy sandy loam or very gravelly, extremely gravelly, or very cobbly ashy coarse sandy loam
Content of gravel—30 to 50 percent
Content of cobbles—10 to 30 percent
Content of stones—0 to 15 percent
Content of pumice—0 to 10 percent

C horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 to 4 dry or moist
Texture—extremely gravelly or extremely cobbly ashy sandy loam or extremely gravelly or very cobbly ashy loamy coarse sand
Content of gravel—40 to 60 percent
Content of cobbles—10 to 40 percent
Content of stones—0 to 20 percent
Content of pumice—0 to 10 percent

Finney Series

Soil depth: Deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Upper backslopes and shoulders
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from metasedimentary rock
Slope: 15 to 65 percent
Elevation: 4,400 to 5,900 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Loamy-skeletal, isotic Andic Eutrocryepts

Typical Pedon

Finney gravelly ashy sandy loam, in an area of Myerscreek-Finney complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 6 miles northwest of Conconully, Washington, and 2 miles south of Salmon Meadows; Coxit Mountain USGS topographic quadrangle; latitude 48 degrees 37 minutes 36 seconds north and longitude 119 degrees 50 minutes 39 seconds west.

Oe—1 inch to 0; moderately decomposed mat of organic matter consisting of needles and twigs.
A—0 to 2 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common fine and very fine and few medium and coarse roots; many fine tubular pores; 20 percent gravel; neutral; clear wavy boundary.
Bw—2 to 10 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many fine and medium and common

coarse roots; many fine tubular pores; 20 percent gravel; neutral; clear wavy boundary.
2C1—10 to 20 inches; pale yellow (2.5Y 7/3) very gravelly sandy loam, light olive brown (2.5Y 5/3) moist; massive; slightly hard, friable, slightly sticky and nonplastic; common fine and medium roots; common fine irregular pores; 40 percent gravel and 3 percent cobbles; slightly acid; gradual wavy boundary.
2C2—20 to 32 inches; pale yellow (2.5Y 7/3) very gravelly sandy loam, light olive brown (2.5Y 5/4) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few fine, medium, and coarse roots; common fine irregular pores; 50 percent gravel and 3 percent cobbles; neutral; gradual wavy boundary.
3C3—32 to 43 inches; light yellowish brown (2.5Y 6/4) very gravelly sandy loam, light olive brown (2.5Y 5/4) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few medium roots; common fine irregular pores; 50 percent angular pebbles and 3 percent angular cobbles; neutral; abrupt irregular boundary.
3R—43 inches; metasedimentary bedrock.

Range in Characteristics

Depth to bedrock: 40 to 60 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent
Soil moisture regime: Xeric
Note: Some pedons have a C horizon consisting of 140 to 190 year old “T” or 450 to 500 year old “W” ash from Mount Saint Helens.

A horizon:
Value—5 to 7 dry, 3 to 5 moist
Chroma—2 to 4 dry or moist
Texture—gravelly or stony ashy sandy loam
Content of gravel—15 to 25 percent
Content of stones—0 to 20 percent

Bw horizon:
Value—6 or 7 dry, 3 to 5 moist
Chroma—3 or 4 dry or moist
Content of gravel—15 to 30 percent
Content of cobbles—0 to 5 percent

2C and 3C horizons:
Hue—10YR or 2.5YR
Value—6 or 7 dry, 4 or 5 moist
Chroma—3 to 6 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—25 to 50 percent
Content of cobbles—0 to 20 percent
Content of stones—0 to 5 percent

Foggydew Series

Soil depth: Deep
Drainage class: Well drained
Landscape: Foothills and mountains
Position on landscape: Shoulders, ridges, and backslopes
Parent material: Mixed volcanic ash (20 to 30 inches) over colluvium, residuum, and glacial till from sedimentary and volcanic rock
Slope: 35 to 75 percent
Elevation: 2,600 to 4,000 feet

Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 110 to 150 days
Taxonomic classification: Loamy-skeletal, mixed, superactive, mesic Vitrandic Haploxerolls

Typical Pedon

Foggydew ashy gravelly sandy loam, in an area of Johntom-Foggydew-Rock outcrop complex, 35 to 75 percent slopes; Okanogan National Forest Area, Washington; about 8 miles southwest of Carlton, Washington; 2,300 feet east and 2,100 feet north of the southwest corner of sec. 9, T. 31 N., R. 21 E.; latitude 48 degrees 11 minutes 58 seconds north and longitude 120 degrees 13 minutes 3 seconds west.

A1—0 to 7 inches; brown (10YR 5/3) gravelly ashy sandy loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common fine irregular pores; 30 percent gravel; slightly acid; gradual wavy boundary.

A2—7 to 12 inches; brown (10YR 5/3) very gravelly ashy sandy loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; common fine irregular pores; 40 percent gravel; slightly acid; clear wavy boundary.

A3—12 to 20 inches; brown (10YR 5/3) very gravelly ashy sandy loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine irregular pores; 55 percent gravel; slightly acid; clear wavy boundary.

2Bw1—20 to 27 inches; yellowish brown (10YR 5/4) extremely gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine irregular pores; 60 percent gravel and 10 percent cobbles; slightly acid; gradual wavy boundary.

2Bw2—27 to 42 inches; yellowish brown (10YR 5/4) extremely gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common fine irregular pores; 65 percent gravel and 20 percent cobbles; slightly acid; gradual wavy boundary.

2Bw3—42 to 53 inches; yellowish brown (10YR 5/4) extremely gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few fine and very fine roots; common fine irregular pores; 70 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.

2R—53 inches; fractured andesite.

Range in Characteristics

Depth to bedrock: 40 to 60 inches
Thickness of the material influenced by mixed volcanic ash: 20 to 30 inches
Content of rock fragments in the particle-size control section: 50 to 75 percent
Thickness of the mollic epipedon: 20 to 30 inches

A1 horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—1 to 3 dry or moist
Content of gravel—15 to 35 percent

A2 horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—1 to 3 dry or moist

Texture—gravelly or very gravelly ashy sandy loam
Content of gravel—15 to 50 percent

A3 horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—1 to 3 dry or moist
Texture—ashy sandy loam, gravelly ashy sandy loam, very gravelly ashy sandy loam, or extremely gravelly ashy sandy loam
Content of gravel—25 to 65 percent
Content of cobbles—0 to 10 percent

2Bw horizon:
Value—4 to 6 dry, 3 or 4 moist
Chroma—2 to 4 dry or moist
Texture—very gravelly, extremely gravelly, or extremely cobbly sandy loam
Content of gravel—40 to 75 percent
Content of cobbles—0 to 30 percent
Content of stones—0 to 5 percent

Fulvicryands

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Brush covered avalanche chutes and avalanche debris fans of glacial-trough valleys
Parent material: Volcanic ash mixed with colluvium over fragmental material
Slope: 35 to 90 percent
Elevation: 4,000 to 5,800 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days
Taxonomic classification: Fulvicryands

Reference Pedon

Fulvicryands, in an area of Typic Vitricryands-Andic Haplocryods-Fulvicryands association, 35 to 90 percent slopes; Okanogan National Forest Area, Washington; about 0.25 mile southwest of Rainy Pass; 1,800 feet west and 350 feet north of the southeast corner of sec. 21, T. 35 N., R. 17 E.; latitude 48 degrees 30 minutes 52 seconds north and longitude 120 degrees 44 minutes 17 seconds west.

Oi—5 to 3 inches; slightly decomposed mat of leaves, roots, moss, and twigs; abrupt smooth boundary.
Oe—3 inches to 0; moderately decomposed mat of leaves, roots, moss, and twigs; abrupt smooth boundary.
A1—0 to 5 inches; very dark brown (10YR 2/2) very stony medial sandy loam, black (10YR 2/1) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium and coarse roots; few very fine tubular pores; 20 percent gravel, 5 percent cobbles, and 15 percent stones; very strongly acid; clear wavy boundary.
A2—5 to 12 inches; very dark grayish brown (10YR 3/2) gravelly medial sandy loam, very dark brown (10YR 2/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium and coarse roots; few very fine tubular pores; 25 percent gravel and 5 percent cobbles; very strongly acid; clear wavy boundary.

Bw—12 to 18 inches; light yellowish brown (10YR 6/4) very gravelly medial sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine and few medium and coarse roots; few fine irregular pores; 30 percent gravel, 15 percent cobbles, and 5 percent stones; very strongly acid; clear wavy boundary.
2C1—18 to 28 inches; brown (10YR 5/3) extremely cobbly sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; few very fine irregular pores; 20 percent gravel, 50 percent cobbles, and 5 percent stones; moderately acid; gradual wavy boundary.
2C2—28 to 60 inches; fragmental material consisting of 30 percent gravel, 60 percent cobbles, and 10 percent stones.

Range in Characteristics

Depth to fragmental material: 20 to 40 inches
Rock fragments: 20 to 50 percent in the solum and 60 to 100 percent in the substratum
Thickness of the umbric epipedon: 10 to 20 inches

A horizon:
Value—2 or 3 dry, 1 or 2 moist
Texture—stony medial sandy loam, very stony medial sandy loam, or gravelly medial sandy loam
Content of gravel—15 to 25 percent
Content of cobbles—5 to 10 percent
Content of stones—0 to 15 percent
Content of organic matter—18 to 25 percent

Bw horizon:
Hue—10YR or 7.5YR
Value—4 to 6 dry, 3 or 4 moist
Chroma—3 or 4 moist
Texture—very gravelly medial sandy loam or very cobbly medial sandy loam
Content of gravel—25 to 40 percent
Content of cobbles—10 to 20 percent
Content of stones—0 to 5 percent
Content of organic matter—10 to 20 percent

2C1 horizon:
Value—4 to 6 dry, 3 to 5 moist
Chroma—3 or 4 dry or moist
Texture—extremely cobbly, extremely gravelly, or extremely stony sandy loam
Content of gravel—20 to 45 percent
Content of cobbles—20 to 60 percent
Content of stones—5 to 30 percent
Content of organic matter—5 to 10 percent

2C2 horizon:
Fragmental material consisting of gravel, cobbles, and stones

Gahee Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Terraces
Parent material: Volcanic ash (16 to 22 inches) over glacial outwash

Slope: 0 to 15 percent
Elevation: 4,200 to 6,500 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 75 to 95 days
Taxonomic classification: Ashy over loamy, glassy over isotic Xeric Vitricryands

Typical Pedon

Gahee ashy loam; North Ferry Area, Washington; on a logging spur on the south side of the south fork of Sherman Creek, 1/2 mile west of Barnaby Creek Road; SE1/4NE1/4 sec. 8, T. 35 N., R. 35 E.; latitude 48 degrees 32 minutes 57 seconds north and longitude 118 degrees 26 minutes 14 seconds west.

Oi—1 inch to 0.5; slightly decomposed mat of leaves, needles, and twigs.
Oe—0.5 inch to 0; moderately decomposed mat of leaves, needles, and twigs.
C—0 to 3 inches; pinkish white (7.5YR 8/2) ashy very fine sandy loam, brown (7.5YR 5/3) moist; weak fine and medium subangular blocky structure; soft, friable, nonsticky and nonplastic; many fine roots; neutral; abrupt smooth boundary.
Bw—3 to 19 inches; light brown (7.5YR 6/4) ashy loam, brown (7.5YR 4/4) moist; weak fine and medium subangular blocky structure; soft, friable, nonsticky and nonplastic; many fine roots; root mat at lower boundary; slightly acid; abrupt wavy boundary.
2C1—19 to 31 inches; white (N 8/0) sandy loam, light gray (N 7/0) moist; massive; slightly hard, slightly firm, slightly sticky and nonplastic; few medium roots; neutral; abrupt wavy boundary.
3C2—31 to 60 inches; very pale brown (10YR 8/3) coarse sand, pale brown (10YR 6/3) moist; single grain; loose; neutral.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 16 to 22 inches
Depth to strongly contrasting textural stratification: 20 to 40 inches
Depth to glacial outwash: 16 to 22 inches
Rock fragments: 0 to 10 percent
Note: Not all pedons have a C horizon.

C horizon (where present):
Hue—10YR or 7.5YR
Value—6 to 8 dry
Chroma—1 or 2 dry

Bw horizon:
Value—6 or 7 dry
Chroma—3 or 4 dry or moist
Texture—ashy loam, ashy silt loam, or ashy very fine sandy loam

2C horizon:
Hue—10YR, 7.5YR, or neutral
Value—7 or 8 dry
Chroma—0 to 2 dry
Texture—sandy loam or loamy sand

Gatewall Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Toeslopes, footslopes, and backslopes

Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 15 to 65 percent
Elevation: 4,200 to 5,900 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Loamy-skeletal, isotic Andic Eutrocryepts

Typical Pedon

Gatewall ashy sandy loam, in an area of Gatewall ashy sandy loam, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 3.5 miles northwest of Mazama, Washington; about 1,900 feet west and 500 feet north of the southeast corner of sec. 11, T. 36 N., R. 19 E.; latitude 48 degrees 37 minutes 49 seconds north and longitude 120 degrees 25 minutes 58 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.

A—0 to 4 inches; pale brown (10YR 6/3) ashy sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; moderately smeary; many very fine and fine and few medium and coarse roots; common very fine and fine pores; 5 percent gravel; slightly acid; clear smooth boundary.

Bw—4 to 13 inches; light yellowish brown (10YR 6/4) ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; moderately smeary; common very fine and fine and few medium and coarse roots; common very fine and fine pores; 10 percent gravel; slightly acid; clear smooth boundary.

2BC—13 to 24 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common very fine and fine pores; 30 percent gravel and 5 percent cobbles; slightly acid; gradual wavy boundary.

2Cd1—24 to 34 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine and fine roots; few fine pores; 35 percent gravel and 10 percent cobbles; neutral; clear wavy boundary.

2Cd2—34 to 39 inches; pale brown (10YR 6/3) very gravelly sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, nonsticky and slightly plastic; few very fine and fine roots; few very fine pores; 30 percent gravel and 10 percent cobbles; neutral; clear wavy boundary.

3Cd3—39 to 60 inches; brown (7.5YR 5/2) very gravelly sandy loam, dark brown (7.5YR 4/2) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine pores; 30 percent gravel and 10 percent cobbles; neutral.

Range in Characteristics

Depth to glacial till: 7 to 14 inches
Depth to densic material: 20 to 30 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent
Soil moisture regime: Xeric

A horizon:
Value—3 or 4 moist
Chroma—3 or 4 dry or moist
Content of gravel—0 to 10 percent

Bw horizon:
Chroma—3 or 4 dry or moist
Texture—ashy sandy loam or gravelly ashy sandy loam
Content of gravel—10 to 20 percent

2BC horizon:
Value—3 or 4 moist
Chroma—2 to 4 dry or moist
Texture—gravelly, very gravelly, or very cobbly sandy loam
Content of gravel—20 to 35 percent
Content of cobbles—5 to 15 percent

2Cd horizon:
Hue—7.5YR, 2.5Y or 10YR
Value—4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—30 to 40 percent
Content of cobbles—10 to 20 percent

3Cd horizon:
Hue—5YR, 7.5YR, or 10YR
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—25 to 35 percent
Content of cobbles—10 to 20 percent

Goddard Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Outwash terraces and terrace escarpments
Parent material: Volcanic ash (7 to 14 inches) over glacial outwash
Slope: 0 to 35 percent
Elevation: 2,800 to 5,100 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 39 to 44 degrees F
Frost-free period: 90 to 130 days
Taxonomic classification: Sandy-skeletal, isotic, frigid Andic Haploxerepts

Typical Pedon

Goddard ashy fine sandy loam, in an area of Goddard-Parmenter complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 5 miles west of Wauconda, Washington; 2,000 feet west and 600 feet north of the southeast corner of sec. 3, T. 37 N., R. 29 E.; latitude 48 degrees 43 minutes 42 seconds north and longitude 119 degrees 10 minutes 3 seconds west.

Oe—1 inch to 0; moderately decomposed needles, twigs, and grass.
A—0 to 6 inches; grayish brown (10YR 5/2) ashy fine sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium roots; few fine pores; 5 percent gravel; neutral; clear smooth boundary.
Bw—6 to 12 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable,

nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium roots; few fine pores; 15 percent gravel; slightly acid; clear wavy boundary.

2C1—12 to 25 inches; light gray (10YR 7/2) very gravelly loamy sand, light brownish gray (10YR 6/2) moist; single grain; loose; common very fine and fine and few medium roots; common fine irregular pores; 45 percent gravel and 10 percent cobbles; slightly acid; gradual wavy boundary.

2C2—25 to 60 inches; multicolored extremely gravelly loamy sand; single grain; loose; common very fine and fine roots in the upper 10 inches; common fine irregular pores; 55 percent gravel and 10 percent cobbles; neutral.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 7 to 14 inches
Depth to strongly contrasting textural stratification (2C horizon): 10 to 20 inches
Content of rock fragments in the particle-size control section: 35 to 75 percent
Note: Some pedons have a thin C horizon directly below the organic layer. The C horizon consists of a 140 to 190 year old “T” or 450 to 500 year old “W” ash from Mount Saint Helens.

A horizon:
Value—4 or 5 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Content of gravel—0 to 15 percent

Bw horizon:
Value—4 to 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Texture—ashy fine sandy loam or gravelly ashy sandy loam
Content of gravel—5 to 25 percent
Content of cobbles—0 to 5 percent

2C horizon:
Value—6 or 7 dry, 5 or 6 moist
Chroma—2 or 3 dry or moist; multicolored in some pedons
Texture—very gravelly or extremely gravelly loamy sand to coarse sand
Content of gravel—40 to 60 percent
Content of cobbles—5 to 15 percent

Goshawk Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Shoulders and upper backslopes
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from sedimentary and volcanic rock
Slope: 35 to 65 percent
Elevation: 3,500 to 5,200 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Andic Haploxeralfs

Typical Pedon

Goshawk gravelly ashy sandy loam, in an area of Rendovy-Goshawk complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; 9 miles north of

Winthrop, Washington; 600 feet east and 1,600 feet south of the northwest corner of sec. 21, T. 36 N., R. 21 E.; latitude 48 degrees 36 minutes 33 seconds north and longitude 120 degrees 13 minutes 39 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.

A—0 to 9 inches; brown (10YR 5/3) gravelly ashy sandy loam, dark yellowish brown (10YR 3/4) moist; moderate fine and medium subangular blocky structure parting to moderate fine and medium granular; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, fine, and coarse roots; many very fine irregular pores; 15 percent gravel; slightly acid; clear smooth boundary.

Bw—9 to 14 inches; brown (7.5YR 5/4) gravelly ashy sandy loam, dark brown (7.5YR 3/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; moderately smeary; common very fine, fine, and coarse roots; many very fine irregular pores; 15 percent gravel; moderately acid; gradual smooth boundary.

2Bt1—14 to 20 inches; brown (10YR 5/3) extremely gravelly loam, dark brown (10YR 4/3) moist; strong fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine, fine, and coarse roots; many very fine irregular and common very fine vesicular and tubular pores; common discontinuous faint clay films on faces of peds and in pores; 65 percent gravel and 10 percent cobbles; moderately acid; clear smooth boundary.

2Bt2—20 to 27 inches; brown (10YR 5/3) extremely gravelly loam, dark brown (10YR 4/3) moist; strong fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine, fine, and coarse roots; many very fine irregular and common very fine vesicular and tubular pores; few discontinuous faint clay films on faces of peds and in pores; 70 percent gravel and 10 percent cobbles; moderately acid; clear smooth boundary.

2R—27 inches; fractured andesite.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 40 to 70 percent

A horizon:
- Value—4 or 5 dry, 2 or 3 moist
- Chroma—2 or 3 dry, 3 or 4 moist
- Content of gravel—15 to 25 percent
- Content of cobbles—0 to 5 percent

Bw horizon:
- Hue—7.5YR or 10YR
- Value—4 to 6 dry, 3 to 5 moist
- Chroma—3 or 4 dry or moist
- Texture—gravelly ashy loam or gravelly ashy sandy loam
- Content of gravel—15 to 25 percent
- Content of cobbles—0 to 5 percent

2Bt horizon:
- Value—4 to 6 dry, 3 to 5 moist
- Chroma—3 or 4 dry or moist
- Texture—extremely gravelly loam, very gravelly loam, or very gravelly sandy loam
- Content of gravel—30 to 80 percent
- Content of cobbles—5 to 30 percent

Granflat Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Outwash terraces and low stream terraces
Parent material: Mixed volcanic ash (10 to 16 inches) over glacial outwash and alluvium
Slope: 0 to 10 percent
Elevation: 2,600 to 3,200 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 39 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Sandy-skeletal, isotic, frigid Vitrandic Haploxerolls

Typical Pedon

Granflat gravelly ashy sandy loam, in an area of Granflat gravelly ashy sandy loam, 0 to 10 percent slopes; Okanogan National Forest Area, Washington; 15 miles north-northeast of Winthrop, Washington; 2,100 feet south and 1,700 feet west of the northeast corner of sec. 5, T. 36 N., R. 21 E.; latitude 48 degrees 38 minutes 1 second north and longitude 120 degrees 14 minutes 16 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.

A—0 to 6 inches; very dark grayish brown (10YR 3/2) gravelly ashy sandy loam, black (10YR 2/1) moist; weak very fine and fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; many very fine and fine interstitial pores; 15 percent gravel and 5 percent cobbles; slightly acid; clear smooth boundary.

AB—6 to 9 inches; dark brown (10YR 3/3) very cobbly ashy sandy loam, black (10YR 2/1) moist; weak very fine and fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; many very fine and fine interstitial pores; 20 percent gravel and 15 percent cobbles; slightly acid; clear wavy boundary.

Bw—9 to 15 inches; brown (10YR 4/3) very cobbly ashy sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; many very fine and fine interstitial pores; 25 percent gravel and 20 percent cobbles; neutral; clear wavy boundary.

2C1—15 to 25 inches; multicolored extremely cobbly sand; single grain; loose, nonsticky and nonplastic; few very fine roots; many very fine and fine interstitial pores; 50 percent gravel and 30 percent cobbles; neutral; clear wavy boundary.

2C2—25 to 60 inches; multicolored extremely gravelly sand; single grain; loose, nonsticky and nonplastic; few very fine roots; many very fine and fine interstitial pores; 55 percent gravel and 20 percent cobbles; neutral.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 10 to 16 inches
Content of rock fragments in the particle-size control section: 55 to 85 percent
Thickness of the mollic epipedon: 10 to 16 inches

A horizon:
Value—3 to 5 dry, 2 to 4 moist
Chroma—1 to 3 dry or moist
Content of gravel—10 to 20 percent
Content of cobbles—0 to 5 percent
Content of stones—0 to 5 percent

AB horizon:
Value—3 to 5 dry, 2 to 4 moist
Chroma—1 to 3 dry or moist
Texture—very cobbly, very gravelly, or gravelly ashy sandy loam
Content of gravel—15 to 30 percent
Content of cobbles—5 to 20 percent

Bw horizon:
Value—4 to 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Texture—very cobbly or very gravelly ashy sandy loam
Content of gravel—15 to 35 percent
Content of cobbles—10 to 30 percent

2C horizon:
Texture—extremely cobbly or extremely gravelly sand
Content of gravel—40 to 65 percent
Content of cobbles—10 to 30 percent

Growden Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, generally on southerly aspects
Parent material: Volcanic ash (7 to 14 inches) over residuum and colluvium from siliceous rock
Slope: 15 to 65 percent
Elevation: 5,500 to 6,500 feet
Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 80 to 90 days
Taxonomic classification: Loamy-skeletal, isotic Andic Dystrocryepts

Typical Pedon

Growden ashy fine sandy loam; North Ferry Area, Washington; on Barnaby Buttes in the Colville National Forest; NW1/4SW1/4 sec. 18, T. 35 N., R. 35 E.; latitude 48 degrees 31 minutes 46 seconds north and longitude 118 degrees 28 minutes 33 seconds west.

A1—0 to 6 inches; dark grayish brown (10YR 4/2) ashy fine sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse granular structure; soft, very friable, nonsticky and nonplastic; many fine roots; 10 percent fine gravel and gravel; strongly acid; clear wavy boundary.
A2—6 to 12 inches; brown (10YR 4/3) ashy fine sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many fine roots; 10 percent fine gravel and gravel; moderately acid; clear wavy boundary.
2A3—12 to 24 inches; brown (10YR 4/3) stony fine sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; many fine roots; 10 percent fine gravel and 20 percent angular stones; moderately acid; clear wavy boundary.
2AC—24 to 36 inches; brown (10YR 5/3) very stony sandy loam, dark brown (10YR 3/3) moist; single grain; loose, nonsticky and nonplastic; few fine roots; 10 percent fine gravel and 40 percent angular stones; moderately acid; clear wavy boundary.

2C—36 to 60 inches; brown (10YR 5/3) stony sandy loam, dark yellowish brown (10YR 3/4) moist; single grain; loose, nonsticky and nonplastic; 10 percent gravel and 20 percent angular stones; moderately acid.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 7 to 14 inches
Thickness of the umbric epipedon: 20 to 40 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent
Soil moisture regime: Xeric

A horizon:
- Value—4 or 5 dry, 2 or 3 moist
- Chroma—2 or 3 dry or moist
- Content of gravel—0 to 15 percent
- Content of cobbles—0 to 10 percent

2A horizon:
- Value—4 or 5 dry, 2 or 3 moist
- Chroma—2 or 3 dry or moist
- Texture—fine sandy loam or sandy loam or the gravelly, cobbly, or stony analogs of those textures
- Content of gravel—0 to 20 percent
- Content of cobbles—0 to 25 percent
- Content of stones—0 to 25 percent

2AC horizon:
- Value—4 or 5 dry, 2 or 3 moist
- Chroma—2 or 3 dry or moist
- Texture—gravelly to very stony sandy loam
- Content of gravel—5 to 30 percent
- Content of cobbles—0 to 30 percent
- Content of stones—10 to 50 percent

2C horizon:
- Value—5 to 7 dry, 3 to 5 moist
- Chroma—3 or 4 dry or moist
- Texture—gravelly to very stony sandy loam
- Content of gravel—5 to 30 percent
- Content of cobbles—0 to 30 percent
- Content of stones—10 to 50 percent

Haplosaprists

Soil depth: Very deep
Drainage class: Very poorly drained
Landscape: Mountains
Position on landscape: Lake basins and depressions in till plains, ground moraines, and terraces
Parent material: Organic soil material over alluvium or glacial lake sediments
Slope: 0 to 5 percent
Elevation: 2,800 to 5,000 feet
Mean annual precipitation: 18 to 25 inches
Mean annual air temperature: 39 to 44 degrees F
Frost-free period: 80 to 100 days
Taxonomic classification: Haplosaprists

Reference Pedon

Haplosaprists; Colville Indian Reservation, Washington; about 21 miles north of Nespelem, Washington; 1,700 feet north and 1,000 feet west of the southeast corner of sec. 11, T. 34 N., R. 31 E.; latitude 48 degrees 27 minutes 34 seconds north and longitude 118 degrees 52 minutes 16 seconds west.

Oe—0 to 8 inches; grayish brown (10YR 5/2) mucky peat, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; 75 percent fiber, 40 percent rubbed; many very fine, fine, and medium roots; slightly acid; clear smooth boundary.

Oa—8 to 18 inches; very dark gray (10YR 3/1) muck, black (10YR 2/1) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; 45 percent fiber, 15 percent rubbed; many very fine, fine, and medium roots; slightly acid; abrupt smooth boundary.

A—18 to 34 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common fine irregular pores; neutral; abrupt smooth boundary.

Cg1—34 to 44 inches; light brownish gray (10YR 6/2) silt loam, very dark grayish brown (10YR 3/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few fine irregular pores; neutral; abrupt smooth boundary.

Cg2—44 to 55 inches; light gray (10YR 7/2) fine sandy loam, grayish brown (10YR 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; few fine irregular pores; neutral; abrupt smooth boundary.

O´a—55 to 60 inches; black (10YR 2/1) muck, black (10YR 2/1) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; 30 percent fiber, 10 percent rubbed; few very fine roots; neutral.

Range in Characteristics

Depth to mineral soil material: 16 to more than 60 inches
Seasonal high water table: Present throughout the year

Oa horizon:
- Value—2 or 3 dry
- Chroma—1 or 2 dry or moist

A horizon:
- Value—3 or 4 dry, 2 or 3 moist
- Chroma—1 or 2 dry or moist
- Texture—silt loam, very fine sandy loam, or fine sandy loam or the gravelly analogs of those textures
- Content of gravel—0 to 25 percent

Cg horizon:
- Value—5 to 7 dry, 3 to 5 moist
- Chroma—1 or 2 dry or moist
- Texture—stratified silt loam to coarse sand or the gravelly or very gravelly analogs of those textures

Histic Cryaquepts

Soil depth: Very deep
Drainage class: Very poorly drained
Landscape: Mountains
Position on landscape: Valley bottoms

Parent material: Organic soil material over alluvium and glacial till
Slope: 0 to 10 percent
Elevation: 5,000 to 6,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 60 to 80 days
Taxonomic classification: Histic Cryaquepts

Reference Pedon

Histic Cryaquepts, in an area of Histic Cryaquepts-Cryohemists complex, 0 to 10 percent slopes; Okanogan National Forest Area, Washington; about 2 miles north of Tiffany Mountain; 1,400 feet east and 3,000 feet south of the northwest corner of sec. 21, T. 37 N., R. 23 E.; latitude 48 degrees 41 minutes 24 seconds north and longitude 119 degrees 57 minutes 52 seconds west.

Oe—0 to 8 inches; very dark gray (10YR 3/1) mucky peat, black (10YR 2/1) moist; about 35 percent fiber, 20 percent rubbed; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and medium and few coarse roots; slightly acid; clear smooth boundary.

A—8 to 10 inches; very dark gray (10YR 3/1) silt loam, black (10YR 2/1) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; common very fine and fine pores; slightly acid; clear wavy boundary.

Bw—10 to 15 inches; brownish yellow (10YR 6/6) fine sandy loam, dark yellowish brown (10YR 4/6) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; moderately smeary; many very fine and fine roots; common fine pores; slightly acid; clear wavy boundary.

2Cg1—15 to 21 inches; grayish brown (10YR 5/2) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; many fine and medium distinct dark yellowish brown (10YR 4/6) redoximorphic concentrations; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; 35 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.

2Cg2—21 to 34 inches; gray (5Y 6/1) gravelly sandy loam, greenish gray (5GY 4/1) moist; few fine prominent dark yellowish brown (10YR 4/6) redoximorphic concentrations; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; 15 percent gravel; slightly acid; gradual wavy boundary.

3Cg3—34 to 60 inches; gray (5Y 5/1) very gravelly loamy sand, dark gray (5Y 5/1) moist; single grain; soft, very friable, nonsticky and nonplastic; 40 percent gravel and 5 percent cobbles; slightly acid.

Range in Characteristics

Depth to mineral soil: 8 to 16 inches
Seasonal high water table: Present spring and summer

Oe horizon:
Value—3 or 4 dry, 2 or 3 moist
Chroma—1 or 2 dry or moist

A horizon:
Value—3 or 4 dry, 2 or 3 moist
Chroma—1 or 2 dry or moist

Bw horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 to 6 dry or moist
Texture—sandy loam or fine sandy loam

2Cg horizon:
Hue—10YR, 5Y, or 5GY
Value—5 or 6 dry, 4 or 5 moist
Texture—gravelly sandy loam, very gravelly sandy loam, or very gravelly coarse sandy loam
Content of gravel—15 to 40 percent
Content of cobbles—0 to 5 percent

3Cg horizon:
Hue—5Y or 5GY
Value—5 or 6 dry, 4 or 5 moist
Texture—gravelly coarse sand, very gravelly loamy sand, or very gravelly coarse sand
Content of gravel—15 to 50 percent
Content of cobbles—0 to 5 percent

Hodgson Taxadjunct

Soil depth: Very deep
Drainage class: Moderately well drained
Landscape: Foothills and mountains
Position on landscape: Terraces
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial lake sediments
Slope: 3 to 15 percent
Elevation: 1,300 to 2,000 feet
Mean annual precipitation: 15 to 21 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 100 to 130 days
Taxonomic classification: Fine-loamy, mixed, superactive, mesic Vitrandic Palexeralfs

Typical Pedon

Hodgson ashy silt loam; Okanogan County Area, Washington; about 2 miles south-southeast of Synarep, Washington; about 660 feet west and 100 feet south of the northeast corner of sec. 34, T. 35 N., R. 28 E.; latitude 49 degrees 18 minutes 25 seconds north and longitude 119 degrees 18 minutes 25 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles and twigs.
A—0 to 6 inches; grayish brown (10YR 5/2) ashy silt loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; many roots; many fine and very fine pores; slightly acid; clear smooth boundary.
BA—6 to 9 inches; brown (10YR 5/3) ashy silt loam, dark brown (10YR 3/3) moist; moderate coarse granular structure; soft, very friable, slightly sticky and slightly plastic; many roots; common fine and very fine pores; slightly acid; clear smooth boundary.
2Bt—9 to 15 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate medium prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; many roots; common fine and very fine pores; thin patchy clay films; slightly acid; abrupt smooth boundary.
2C1—15 to 25 inches; light gray (2.5Y 7/2) silt loam, grayish brown (2.5Y 5/2) moist; massive; hard, friable, moderately sticky and slightly plastic; common roots; many very fine and fine pores; slightly alkaline; abrupt smooth boundary.
2C2—25 to 40 inches; light gray (5Y 7/2) silty clay loam, grayish brown (2.5Y 5/2) moist; finely laminated; very hard, firm, moderately sticky and moderately plastic; few roots; common fine and very fine pores; many distinct olive (5Y 5/6)

redoximorphic concentrations in root channels; slightly effervescent between laminations; strongly alkaline; gradual smooth boundary.
2C3—40 to 60 inches; light gray (5Y 7/2) silty clay loam, grayish brown (2.5Y 5/2) moist; finely laminated; very hard, firm, moderately sticky and moderately plastic; few roots; few fine and very fine pores; common distinct olive (5Y 5/6) redoximorphic concentrations in root channels; slightly effervescent between laminations; moderately alkaline.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 7 to 14 inches
Depth to carbonates: 19 to 31 inches
Seasonal high water table: Present winter and spring

A horizon:
Hue—10YR or 2.5Y
Value—5 or 6 dry, 2 to 4 moist
Chroma—2 or 3 dry or moist

BA horizon:
Value—5 to 7 dry, 3 to 5 moist
Chroma—2 or 3 dry or moist
Texture—ashy loam or ashy silt loam

2Bt horizon:
Hue—10YR, 2.5Y, or 5Y
Value—6 to 8 dry, 3 to 6 moist
Chroma—2 to 4 dry or moist
Texture—silt loam, silty clay loam, clay loam, or silty clay

2C horizon:
Hue—10YR, 2.5Y, or 5Y
Value—6 to 8 dry, 3 to 6 moist
Chroma—2 to 4 dry or moist
Texture—silt loam, silty clay loam, clay loam, or silty clay

The Hodgson soils as mapped in the survey area are a taxadjunct to the Hodgson series. The Hodgson series is classified in the fine family and has 35 to 45 percent clay. The Hodgson soils in this survey have 25 to 35 percent clay.

Humic Dystrocryepts

Soil depth: Moderately deep to very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Shoulders of glacial-trough valleys
Parent material: Volcanic ash (3 to 7 inches) over granitic colluvium
Slope: 15 to 75 percent
Elevation: 5,600 to 7,200 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days
Taxonomic classification: Humic Dystrocryepts

Reference Pedon

Humic Dystrocryepts, in an area of Humic Vitricryands-Humic Dystrocryepts complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; Pasayten Wilderness Area, South Spur Bunker Hill; NW$^{1}/_{4}$SW$^{1}/_{4}$ sec. 16, T. 40 N., R. 19 E.;

latitude 48 degrees 57 minutes 51 seconds north and longitude 120 degrees 29 minutes 26 seconds west.

A1—0 to 7 inches; very dark gray (10YR 3/1) ashy silt loam, black (10YR 2/1) moist; weak very fine granular structure; soft, loose, slightly sticky and slightly plastic; many very fine and fine roots; few fine dendritic tubular and common very fine irregular pores; 5 percent gravel and 5 percent cobbles; moderately acid; clear wavy boundary.

A2—7 to 12 inches; dark gray brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure; soft, loose, slightly sticky and slightly plastic; common very fine and fine roots; few fine dendritic tubular and common very fine irregular pores; 5 percent gravel and 5 percent cobbles; moderately acid; abrupt wavy boundary.

A3—12 to 24 inches; grayish brown (10YR 5/2) gravelly silt loam, very dark brown (10YR 2/2) moist; weak fine and medium subangular blocky structure; soft, loose, slightly sticky and slightly plastic; common very fine and fine roots; few fine dendritic tubular and common very fine irregular pores; 20 percent gravel and 5 percent cobbles; moderately acid; abrupt wavy boundary.

2Bw—24 to 30 inches; pale brown (10YR 6/3) very gravelly coarse sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; loose, loose, nonsticky and nonplastic; few very fine roots; common very fine irregular pores; 25 percent gravel and 10 percent cobbles; moderately acid; clear wavy boundary.

2R—30 inches; granite.

Range in Characteristics

Depth to bedrock: 20 to more than 60 inches
Thickness of the umbric epipedon: 10 to 25 inches
Thickness of the material influenced by mixed volcanic ash: 3 to 7 inches
Soil moisture regime: Udic

Humic Vitricryands

Soil depth: Moderately deep to deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and footslopes of glacial-trough valleys
Parent material: Volcanic ash (14 to 25 inches) over granitic colluvium
Slope: 15 to 75 percent
Elevation: 5,600 to 7,200 feet
Mean annual precipitation: 40 to 80 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days
Taxonomic classification: Humic Vitricryands

Reference Pedon

Humic Vitricryands, in an area of Humic Vitricryands-Humic Dystrocryepts complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; Pasayten Wilderness Area, Boundary Trail, Bald Mountain; SW$^1/_4$NW$^1/_4$ sec. 13, T. 40 N., R. 20 E.; latitude 48 degrees 58 minutes 1 second north and longitude 120 degrees 17 minutes 51 seconds west.

Oi—1 inch to 0; slightly decomposed mat of mosses and grasses; abrupt smooth boundary.

A1—0 to 4 inches; dark gray (10YR 4/1) ashy silt loam, black (10YR 2/1) moist; weak fine subangular blocky structure parting to moderate fine granular; soft, loose,

slightly sticky and slightly plastic; many very fine and fine roots; few fine dendritic tubular and common very fine irregular pores; moderately acid; clear wavy boundary.
A2—4 to 15 inches; dark gray (10YR 4/1) ashy silt loam, black (10YR 2/1) moist; moderate fine and medium subangular blocky structure; soft, loose, slightly sticky and slightly plastic; many very fine and fine roots; few fine dendritic tubular and common very fine irregular pores; 10 percent gravel; moderately acid; abrupt wavy boundary.
2Bw1—15 to 26 inches; light yellowish brown (10YR 6/4) gravelly fine sandy loam, brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; loose, loose, nonsticky and nonplastic; few very fine roots; few fine dendritic tubular and common very fine irregular pores; 20 percent gravel and 10 percent cobbles; moderately acid; clear wavy boundary.
2Bw2—26 to 32 inches; very pale brown (10YR 7/4) very gravelly sandy loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; loose, loose, nonsticky and nonplastic; few very fine roots; common fine irregular pores; 30 percent gravel and 10 percent cobbles; moderately acid; clear wavy boundary.
2Cr—32 to 40 inches; moderately cemented bedrock.
2R—40 inches; bedrock.

Range in Characteristics

Depth to bedrock: 20 to 50 inches
Thickness of the material influenced by volcanic ash: 14 to 25 inches
Thickness of the umbric epipedon: 14 to 25 inches
Soil moisture regime: Udic

Inkler Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Foothills and mountains
Position on landscape: Backslopes and footslopes
Parent material: Volcanic ash (7 to 14 inches) over mixed volcanic ash (7 to 16 inches) over glacial till or colluvium
Slope: 15 to 35 percent
Elevation: 2,200 to 3,000 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Andic Haploxerepts

Typical Pedon

Inkler gravelly ashy silt loam; Stevens County, Washington; on a logging spur above Pierre Creek Road; 1,100 feet south and 600 feet east of the northwest corner of sec. 34, T. 40 N., R. 37 E.; latitude 48 degrees 55 minutes 39 seconds north and longitude 118 degrees 6 minutes 11 seconds west.

A—0 to 4 inches; gray (10YR 5/1) gravelly ashy silt loam, very dark gray (10YR 3/1) moist; weak medium and fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; many fine roots; 20 percent angular pebbles; slightly acid; clear wavy boundary.
Bw1—4 to 9 inches; pale brown (10YR 6/3) gravelly ashy silt loam, dark brown (10YR 4/3) moist; weak medium and fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; common fine and medium roots; 20 percent angular pebbles; slightly acid; clear wavy boundary.
Bw2—9 to 21 inches; pale brown (10YR 6/3) gravelly ashy silt loam, dark brown (10YR 3/3) moist; weak medium and coarse subangular blocky structure; soft,

friable, slightly sticky and slightly plastic; common medium roots; root mat at lower boundary; 25 percent angular pebbles; slightly acid; clear wavy boundary.

2C1—21 to 31 inches; light brownish gray (2.5Y 6/2) very gravelly loam, very dark grayish brown (2.5Y 3/2) moist; massive; hard, firm, slightly sticky and slightly plastic; few fine roots; many fine tubular pores; 35 percent gravel, 10 percent cobbles, and 5 percent stones; slightly acid; gradual wavy boundary.

2C2—31 to 46 inches; light brownish gray (2.5Y 6/2) extremely cobbly loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, firm, slightly sticky and slightly plastic; few fine roots; common medium tubular pores; 30 percent gravel, 20 percent cobbles, and 10 percent stones; neutral; gradual wavy boundary.

2C3—46 to 60 inches; pale yellow (5Y 7/3) extremely cobbly sandy clay loam, olive (5Y 5/3) moist; massive; hard, firm, moderately sticky and moderately plastic; 25 percent gravel, 25 percent cobbles, and 10 percent stones; neutral.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 7 to 14 inches over 7 to 16 inches of mixed volcanic ash

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

A horizon:

Value—4 to 6 dry, 2 to 4 moist
Chroma—1 to 3 dry or moist
Content of rock fragments—15 to 35 percent

Bw1 horizon:

Hue—2.5Y or 10YR
Value—5 to 7 dry, 3 to 5 moist
Chroma—2 to 4 dry or moist
Texture—ashy sandy loam, ashy loam, or ashy silt loam; commonly gravelly, very gravelly, or very cobbly
Content of rock fragments—15 to 50 percent

Bw2 horizon:

Hue—10YR or 2.5Y
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 to 4 moist or dry
Texture—ashy silt loam, ashy loam, or ashy sandy loam; gravelly, cobbly, or very cobbly
Content of gravel—20 to 35 percent
Content of cobbles—0 to 10 percent
Content of stones—0 to 5 percent

2C1 horizon:

Hue—5Y, 2.5Y or 10YR
Value—5 to 7 dry, 3 to 5 moist
Chroma—2 to 4 dry or moist
Texture—loam, silt loam, or sandy loam; very gravelly
Content of rock fragments—40 to 60 percent

2C2 and 2C3 horizons:

Hue—2.5Y or 5Y
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 to 4 dry or moist
Texture—loam, silt loam, sandy loam, or sandy clay loam; very gravelly, very cobbly, extremely gravelly, or extremely cobbly
Content of rock fragments—40 to 70 percent

Jantill Series

Soil depth: Very deep
Drainage class: Somewhat excessively drained
Landscape: Mountains
Position on landscape: Backslopes and footslopes, generally on northerly aspects
Parent material: Volcanic ash (7 to 14 inches) over glacial till and glacial outwash
Slope: 15 to 65 percent
Elevation: 4,900 to 6,800 feet
Mean annual precipitation: 35 to 40 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days
Taxonomic classification: Sandy-skeletal, isotic Andic Dystrocryepts

Typical Pedon

Jantill stony ashy sandy loam, in an area of Jantill-Rock outcrop complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 1 mile north of Mount Bonaparte; 600 feet east and 300 feet south of the northwest corner of sec. 13, T. 38 N., R. 29 E.; latitude 48 degrees 47 minutes 52 seconds north and longitude 119 degrees 7 minutes 6 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles, twigs, and leaves; abrupt smooth boundary.

C—0 to 1 inch; light gray (10YR 7/1) stony ashy silt loam, grayish brown (10YR 5/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few coarse roots; common very fine and fine tubular pores; 10 percent gravel, 5 percent cobbles, and 5 percent stones; moderately acid; clear wavy boundary.

2A—1 to 4 inches; light yellowish brown (10YR 6/4) stony ashy sandy loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium and coarse roots; common very fine and fine irregular pores; 10 percent gravel, 5 percent cobbles, and 5 percent stones; moderately acid; clear smooth boundary.

2Bw—4 to 11 inches; light yellowish brown (10YR 6/4) stony ashy sandy loam, dark brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine, common medium, and few coarse roots; common very fine and fine irregular pores; 15 percent gravel, 5 percent cobbles, and 5 percent stones; moderately acid; clear smooth boundary.

3C1—11 to 27 inches; light brownish gray (2.5Y 6/2) very stony loamy sand, grayish brown (2.5Y 5/2) moist; common fine and medium distinct yellowish brown (10YR 5/6, moist) stains; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; 25 percent gravel, 15 percent cobbles, and 15 percent stones; slightly acid; gradual wavy boundary.

3C2—27 to 60 inches; light gray (2.5Y 7/2) very stony loamy sand, grayish brown (2.5Y 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; 30 percent gravel, 15 percent cobbles, and 20 percent stones; slightly acid.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 65 percent
Soil moisture regime: Udic

C horizon (where present):
Value—7 or 8 dry, 5 or 6 moist
Chroma—1 or 2 dry

Content of gravel—0 to 10 percent
Content of cobbles—5 to 10 percent
Content of stones—0 to 5 percent

2A horizon:
Chroma—3 or 4 dry or moist
Content of gravel—5 to 15 percent
Content of cobbles—0 to 10 percent
Content of stones—5 to 10 percent

2Bw horizon:
Chroma—3 to 6 dry, 3 or 4 moist
Texture—stony or gravelly ashy sandy loam
Content of gravel—10 to 30 percent
Content of cobbles—0 to 5 percent
Content of stones—0 to 15 percent

3C horizon:
Hue—10YR or 2.5Y
Value—6 or 7 dry, 5 or 6 moist
Chroma—2 or 3 dry or moist
Texture—very stony, very cobbly, very gravelly, or extremely gravelly loamy sand
Content of gravel—20 to 60 percent
Content of cobbles—5 to 20 percent
Content of stones—0 to 20 percent

Jimbluff Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Alluvial fans and footslopes
Parent material: Mixed volcanic ash (10 to 20 inches) over alluvium and glacial till
Slope: 5 to 35 percent
Elevation: 2,200 to 4,100 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts

Typical Pedon

Jimbluff gravelly ashy sandy loam, in an area of Jimbluff gravelly ashy sandy loam, 5 to 25 percent slopes; Okanogan National Forest Area, Washington; about 6 miles southeast of Mazama, Washington; about 2,300 feet west and 800 feet south of the northeast corner of sec. 22, T. 35 N., R. 20 E.; latitude 48 degrees 31 minutes 32 seconds north and longitude 120 degrees 19 minutes 31 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.
A—0 to 4 inches; dark grayish brown (10YR 4/2) gravelly ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; common very fine and fine irregular pores; 20 percent gravel and 5 percent cobbles; neutral; clear smooth boundary.
Bw1—4 to 9 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable,

nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; common very fine and fine irregular pores; 25 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.

Bw2—9 to 17 inches; pale brown (10YR 6/3) very cobbly ashy sandy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common very fine and fine irregular pores; 25 percent gravel and 15 percent cobbles; slightly acid; clear wavy boundary.

2C1—17 to 24 inches; light yellowish brown (2.5Y 6/3) very cobbly sandy loam, light olive brown (2.5Y 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; few very fine and fine irregular pores; 30 percent gravel, 20 percent cobbles, and 5 percent stones; slightly acid; gradual wavy boundary.

2C2—24 to 35 inches; light yellowish brown (2.5Y 6/3) extremely cobbly coarse sandy loam, light olive brown (2.5Y 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; few very fine irregular pores; 40 percent gravel, 20 percent cobbles, and 5 percent stones; slightly acid; gradual wavy boundary.

3C3—35 to 60 inches; light brownish gray (2.5Y 6/2) extremely gravelly loamy sand, grayish brown (2.5Y 5/2) moist; single grain; loose, nonsticky and nonplastic; 50 percent gravel, 20 percent cobbles, and 5 percent stones; slightly acid.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 10 to 20 inches
Content of rock fragments in the particle-size control section: 60 to 80 percent

A horizon:
- Value—4 or 5 dry, 3 or 4 moist
- Chroma—2 or 3 dry or moist
- Content of gravel—10 to 20 percent
- Content of cobbles—0 to 5 percent

Bw horizon:
- Chroma—3 or 4 dry or moist
- Texture—gravelly, very gravelly, or very cobbly ashy sandy loam
- Content of gravel—10 to 30 percent
- Content of cobbles—0 to 15 percent

2C horizon:
- Hue—10YR or 2.5Y
- Value—4 or 5 moist
- Chroma—2 or 3 dry or moist
- Texture—very gravelly sandy loam, very cobbly sandy loam, or extremely cobbly coarse sandy loam
- Content of gravel—30 to 50 percent
- Content of cobbles—0 to 30 percent
- Content of stones—0 to 10 percent

3C horizon:
- Hue—10YR or 2.5Y
- Value—5 or 6 dry, 4 or 5 moist
- Chroma—2 or 3 dry or moist
- Texture—extremely gravelly or extremely cobbly loamy sand
- Content of gravel—45 to 55 percent
- Content of cobbles—20 to 30 percent
- Content of stones—0 to 5 percent

Johntom Series

Soil depth: Shallow
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Ridges, shoulders, and upper backslopes, generally on southerly aspects
Parent material: Colluvium and residuum from mixed sedimentary and volcanic rock
Slope: 15 to 75 percent
Elevation: 2,500 to 4,800 feet
Mean annual precipitation: 14 to 22 inches
Mean annual air temperature: 40 to 52 degrees F
Frost-free period: 90 to 140 days
Taxonomic classification: Loamy-skeletal, mixed, superactive, mesic Lithic Haploxerolls

Typical Pedon

Johntom gravelly loam, in an area of Borgeau-Nicmar-Johntom complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 5 miles north of Brodie, Washington; about 700 feet east of the center of sec. 21, T. 39 N., R. 31 E.; latitude 48 degrees 51 minutes 56 seconds north and longitude 118 degrees 54 minutes 37 seconds west.

A1—0 to 3 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and slightly plastic; common very fine and fine roots; 15 percent angular pebbles; neutral; clear smooth boundary.
A2—3 to 12 inches; grayish brown (10YR 5/2) very flaggy loam, very dark grayish brown (10YR 3/2) most; weak fine subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine and fine and few medium roots; common medium irregular pores; 15 percent channers and 35 percent flagstones; neutral; clear wavy boundary.
R—12 inches; highly fractured rhyolite.

Range in Characteristics

Depth to bedrock: 10 to 20 inches
Rock fragments: 35 to 55 percent
Thickness of the mollic epipedon: 7 to 12 inches

A1 horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3 dry or moist
Content of gravel—5 to 15 percent
Content of cobbles—0 to 10 percent

A2 horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3 dry or moist
Texture—very flaggy loam or very flaggy sandy loam
Content of channers—10 to 20 percent
Content of flagstones—25 to 45 percent

Kartar Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains and foothills

Position on landscape: Till plains and outwash terraces
Parent material: Mixed volcanic ash (20 to 30 inches) over glacial till and glacial outwash
Slope: 0 to 65 percent
Elevation: 1,800 to 3,500 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 100 to 130 days
Taxonomic classification: Coarse-loamy, isotic, mesic Vitrandic Haploxerepts

Typical Pedon

Kartar stony ashy sandy loam; Okanogan County Area, Washington; about 470 feet north and 560 feet east of the southwest corner of sec. 9, T. 31 N., R. 23 E.; latitude 48 degrees 11 minutes 37 seconds north and longitude 119 degrees 58 minutes 9 seconds west.

A—0 to 6 inches; light brownish gray (10YR 6/2) stony ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine pores; 10 percent gravel, 5 percent cobbles, and 5 percent stones; neutral; clear wavy boundary.

Bw1—6 to 16 inches; pale brown (10YR 6/3) cobbly ashy sandy loam, brown (10YR 4/3) moist; weak fine and medium prismatic structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many fine pores; 10 percent gravel and 10 percent cobbles; neutral; clear wavy boundary.

Bw2—16 to 28 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine pores; common fine faint dark yellowish brown (10YR 4/4) redoximorphic features; 20 percent gravel; neutral; clear wavy boundary.

2C1—28 to 50 inches; very pale brown (10YR 7/3) very gravelly loamy sand, brown (10YR 5/3) moist; single grain; loose, nonsticky and nonplastic; few roots; many fine interstitial pores; 35 percent gravel; neutral; clear wavy boundary.

2C2—50 to 60 inches; multicolored very gravelly sand; single grain; loose; 40 percent gravel; neutral.

Range in Characteristics

Depth to strongly contrasting textural stratification: 24 to 38 inches
Thickness of the material influenced by mixed volcanic ash: 20 to 30 inches
Content of rock fragments in the particle-size control section: 10 to 35 percent

A horizon:
- Value—5 or 6 dry, 3 or 4 moist
- Chroma—2 or 3 dry or moist
- Texture—ashy sandy loam or stony ashy sandy loam
- Content of gravel—0 to 30 percent
- Content of cobbles—0 to 10 percent
- Content of stones—0 to 10 percent

Bw horizon:
- Value—5 or 6 dry, 3 or 4 moist
- Chroma—3 or 4 dry or moist
- Texture—ashy sandy loam or ashy fine sandy loam or the gravelly or cobbly analogs of those textures
- Content of gravel—5 to 30 percent
- Content of cobbles—0 to 10 percent

2C horizon:
Hue—10YR, 2.5Y, or multicolored
Value—6 or 7 dry, 4 to 6 moist
Chroma—2 or 3 dry or moist
Texture of the fine-earth fraction in the upper part—sand or loamy sand
Content of gravel in the upper part—15 to 35 percent
Content of cobbles in the upper part—0 to 15 percent
Texture in the lower part—fine sand, sand, or coarse sand or the gravelly, very gravelly, or extremely gravelly analogs of those textures
Content of gravel in the lower part—5 to 70 percent
Content of cobbles in the lower part—0 to 15 percent

Karu Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, generally on southerly aspects
Parent material: Mixed volcanic ash (7 to 20 inches) over colluvium over glacial till
Slope: 35 to 65 percent
Elevation: 5,000 to 5,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 41 degrees F
Frost-free period: 60 to 90 days
Taxonomic classification: Loamy-skeletal, isotic Vitrandic Eutrocryepts

Typical Pedon

Karu stony ashy sandy loam, in an area of Karu stony ashy sandy loam, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 1 mile south of Bobcat Mountain; 2,200 feet east and 2,000 feet south of the northwest corner of sec. 13, T. 34 N., R. 23 E.; latitude 48 degrees 26 minutes 50 seconds north and longitude 119 degrees 53 minutes 46 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.
A—0 to 4 inches; light brownish gray (10YR 6/2) stony ashy sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine irregular pores; 5 percent angular pebbles, 5 percent angular cobbles, and 5 percent stones; slightly acid; clear smooth boundary.
Bw—4 to 16 inches; pale brown (10YR 6/3) cobbly ashy sandy loam, dark brown (10YR 4/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; common fine irregular pores; 10 percent angular pebbles and 10 percent angular cobbles; slightly acid; clear wavy boundary.
2C1—16 to 22 inches; light brownish gray (10YR 6/2) very cobbly sandy loam; massive; soft, very friable, nonsticky and nonplastic; few very fine, fine, and medium roots; common very fine and fine irregular pores; 20 percent angular pebbles, 20 percent angular cobbles, and 5 percent stones; slightly acid; clear smooth boundary.
2C2—22 to 33 inches; light brownish gray (10YR 6/2) very cobbly sandy loam; massive; slightly hard, friable, nonsticky and nonplastic; few very fine roots; common very fine and fine irregular pores; 20 percent angular pebbles, 25 percent angular cobbles, and 5 percent stones; slightly acid; clear wavy boundary.

3C3—33 to 60 inches; light gray (10YR 7/2) very gravelly loamy sand, light brownish gray (10YR 6/2) moist; massive; loose, nonsticky and nonplastic; few very fine roots; 45 percent gravel and 5 percent cobbles; slightly acid.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 7 to 20 inches
Content of rock fragments in the particle-size control section: 35 to 65 percent
Soil moisture regime: Xeric

A horizon:
- Value—5 or 6 dry, 3 to 5 moist
- Chroma—2 or 3 dry or moist
- Texture—stony or gravelly ashy sandy loam
- Content of gravel—5 to 10 percent
- Content of cobbles—0 to 5 percent
- Content of stones—0 to 10 percent

Bw horizon:
- Chroma—3 or 4 dry
- Texture—cobbly or gravelly ashy sandy loam
- Content of gravel—10 to 20 percent
- Content of cobbles—0 to 10 percent
- Content of stones—0 to 5 percent

2C horizon:
- Value—5 or 6 dry, 4 or 5 moist
- Chroma—2 or 3 dry or moist
- Texture—very cobbly or very gravelly sandy loam
- Content of gravel—20 to 30 percent
- Content of cobbles—10 to 25 percent
- Content of stones—0 to 5 percent

3C horizon:
- Hue—10YR or 2.5Y
- Value—6 or 7 dry, 5 or 6 moist
- Chroma—2 or 3 dry or moist
- Texture—very gravelly loamy sand, very gravelly sandy loam, or very cobbly sandy loam
- Content of gravel—25 to 45 percent
- Content of cobbles—0 to 20 percent

Koepke Taxadjunct

Soil depth: Deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Footslopes and backslopes
Parent material: Mixed volcanic ash (20 to 30 inches) over glacial till
Slope: 15 to 35 percent
Elevation: 3,900 to 4,700 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 115 days
Taxonomic classification: Coarse-loamy, isotic, frigid Vitrandic Haploxerolls

Typical Pedon

Koepke ashy loam, in an area of Koepke ashy loam, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 3 miles southwest of Havillah, Washington; 400 feet south and 150 feet west of the northeast corner of sec. 25, T. 38 N., R. 28 E.; latitude 48 degrees 46 minutes 10 seconds north and longitude 119 degrees 13 minutes 51 seconds west.

Oe—1 inch to 0; moderately decomposed needles, twigs, and grass; abrupt smooth boundary.

A1—0 to 8 inches; very dark gray (10YR 3/1) ashy loam, black (10YR 2/1) moist; moderate fine and medium granular structure; soft, very friable, slightly sticky and nonplastic; weakly smeary; many very fine and fine and few medium and coarse roots; common very fine pores; 5 percent gravel; neutral; clear smooth boundary.

A2—8 to 21 inches; dark gray (10YR 4/1) ashy loam, black (10YR 2/1) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and few medium and coarse roots; common very fine pores; 10 percent gravel; neutral; clear wavy boundary.

A3—21 to 23 inches; dark grayish brown (10YR 4/2) ashy loam, very dark brown (10YR 2/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine roots; common fine pores; 10 percent gravel and 5 percent cobbles; neutral; clear smooth boundary.

2Bw—23 to 33 inches; light brownish gray (10YR 6/2) cobbly sandy loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; common very fine and fine roots; few fine pores; 20 percent gravel and 10 percent cobbles; neutral; gradual wavy boundary.

2C—33 to 41 inches; light brownish gray (2.5Y 6/2) very gravelly sandy loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine roots; few very fine and fine pores; 35 percent gravel and 5 percent cobbles; neutral; gradual wavy boundary.

2Cd—41 to 60 inches; light brownish gray (2.5Y 6/2) very gravelly sandy loam, grayish brown (2.5Y 5/2) moist; massive; hard, friable, slightly sticky and nonplastic; few very fine roots; 40 percent gravel; neutral.

Range in Characteristics

Depth to densic material: 40 to 60 inches

Thickness of the mollic epipedon: 20 to 30 inches

Thickness of the material influenced by mixed volcanic ash: 20 to 30 inches

Content of rock fragments in the particle-size control section: 0 to 20 percent in the upper part and 15 to 35 percent in the lower part

A horizon:

Value—3 or 4 dry, 2 or 3 moist
Chroma—1 or 2 dry or moist
Content of gravel—0 to 20 percent
Content of cobbles—0 to 5 percent

2Bw and 2C horizons:

Hue—10YR or 2.5Y
Value—5 or 6 dry, 3 to 5 moist
Chroma—2 to 4 dry or moist
Texture—cobbly, gravelly, or very gravelly sandy loam
Content of gravel—15 to 35 percent
Content of cobbles—0 to 10 percent

2Cd horizon:
Hue—2.5Y
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of rock fragments—35 to 60 percent
Content of gravel—15 to 40 percent
Content of cobbles—0 to 20 percent

The Koepke soils as mapped in this survey are a taxadjunct to the Koepke series. The Koepke series is classified as ashy over loamy, glassy over isotic, frigid Humic Vitrixerands. The Koepke soils in this survey do not have andic soil properties.

Lani Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes
Parent material: Mixed volcanic ash (7 to 15 inches) over colluvium and residuum from granite, gneiss, and schist
Slope: 25 to 65 percent
Elevation: 1,800 to 3,700 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 100 to 120 days
Taxonomic classification: Coarse-loamy, isotic, frigid Vitrandic Haploxerolls

Typical Pedon

Lani stony ashy sandy loam. This pedon was identified as a Dinkleman soil in the 1980 soil survey of Okanogan County Area, Washington. The Dinkleman series as mapped in 1980 was outside of the range of characteristics for that series. The Lani series was established for this soil and range in characteristics. The pedon is in the area for the current soil survey of Okanogan County Area, Washington, at NW^1/$_4$SW^1/$_4$ sec. 15, T. 32 N., R. 24 E.; latitude 48 degrees 16 minutes 14 seconds north and longitude 119 degrees 49 minutes 7 seconds west.

Oe—0.5 inch to 0; moderately decomposed mat of needles, twigs, and dry grass.
A1—0 to 8 inches; grayish brown (10YR 5/2) stony ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak thin platy structure; soft, very friable, nonsticky and nonplastic; many roots; many very fine and fine pores; 5 percent gravel and 15 percent stones; slightly acid; abrupt smooth boundary.
A2—8 to 14 inches; grayish brown (10YR 5/2) ashy sandy loam, very dark grayish (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common roots; many fine pores; 10 percent gravel; slightly acid; clear wavy boundary.
2Bw—14 to 28 inches; pale brown (10YR 6/3) fine sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few roots; common fine pores; 5 percent gravel; neutral; clear wavy boundary.
2C—28 to 60 inches; pale brown (10YR 6/3) gravelly fine sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few roots; common fine pores; 20 percent gravel; neutral.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 7 to 15 inches
Content of rock fragments in the particle-size control section: 15 to 35 percent
Thickness of the mollic epipedon: 10 to 20 inches

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—1 to 3 dry or moist
Content of gravel—0 to 15 percent
Content of stones—0 to 15 percent

2Bw horizon:
Value—5 to 7 dry, 3 to 5 moist
Chroma—3 or 4 dry or moist
Texture—fine sandy loam or sandy loam
Content of gravel—0 to 15 percent

2C horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—gravelly sandy loam or gravelly fine sandy loam
Content of gravel—15 to 35 percent

Leftcreek series

Soil depth: Shallow
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Shoulders, ridges, and upper backslopes
Parent material: Volcanic ash (10 to 20 inches) over bedrock
Slope: 35 to 65 percent
Elevation: 1,400 to 2,500 feet
Mean annual precipitation: 12 to 18 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 110 to 140 days
Taxonomic classification: Ashy-skeletal, glassy, mesic Lithic Vitrixerands

Typical Pedon

Leftcreek cobbly ashy sandy loam, in an area of Leftcreek-Rock outcrop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 4 miles south of Methow, Washington; 1,200 feet south and 300 feet east of the northwest corner of sec. 36, T. 30 N., R. 22 E.; latitude 48 degrees 3 minutes 35 seconds north and longitude 120 degrees 2 minutes 0 seconds west.

A—0 to 5 inches; light brownish gray (10YR 6/2) cobbly ashy sandy loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and medium roots; common very fine and fine irregular pores; 15 percent gravel, 10 percent cobbles, and 5 percent stones; slightly acid; gradual wavy boundary.

Bw—5 to 14 inches; pale brown (10YR 6/3) very cobbly ashy sandy loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and medium roots; common very fine and fine irregular pores; 20 percent gravel, 15 percent cobbles, and 5 percent stones; slightly acid; abrupt wavy boundary.

2R—14 inches; granite.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 10 to 20 inches
Depth to bedrock: 10 to 20 inches
Content of rock fragments in the particle-size control section: 35 to 70 percent

A horizon:
- Value—4 to 6 dry, 2 to 4 moist
- Chroma—1 to 3 dry or moist
- Content of gravel—5 to 30 percent
- Content of cobbles—0 to 15 percent
- Content of stones—0 to 10 percent

Bw horizon:
- Value—4 to 6 dry, 3 to 5 moist
- Chroma—2 or 3 dry or moist
- Texture—ashy sandy loam or ashy coarse sandy loam; very gravelly or very cobbly
- Content of gravel—20 to 50 percent
- Content of cobbles—0 to 20 percent
- Content of stones—0 to 5 percent

Leiko Series

Soil depth: Very deep
Drainage class: Somewhat excessively drained
Landscape: Terraces
Position on landscape: Treads and risers
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial outwash
Slope: 3 to 15 percent
Elevation: 1,390 to 3,490 feet
Mean annual precipitation: 15 to 20 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 100 to 130 days
Taxonomic classification: Sandy-skeletal, mixed, mesic Vitrandic Haploxerolls

Typical Pedon

Leiko stony ashy sandy loam. This pedon was identified as a Springdale soil in the 1980 soil survey of Okanogan County Area, Washington. The Springdale series as mapped in 1980 was outside of the range of characteristics for that series. The Leiko series was established for this soil and range in characteristics. The pedon is in the area for the current soil survey of Okanogan County Area, Washington; 650 feet south of a county road, about 4,000 feet northwest of the junction with Children Ranch Road; $NW^1/_4SW^1/_4NE^1/_4NW^1/_4$ sec. 31, T. 35 N., R. 21 E.; latitude 48 degrees 29 minutes 45 seconds north and longitude 120 degrees 16 minutes 6 seconds west.

Oi—1 inch to 0; slightly decomposed organic litter composed of pine needles, leaves, twigs, and cones; strongly acid; abrupt smooth boundary.
A1—0 to 1 inch; dark gray (10YR 4/1) stony ashy sandy loam, black (10YR 2/1) moist; weak thin platy structure; soft, very friable, nonsticky and nonplastic; many roots; many very fine pores; 5 percent gravel and 10 percent stones; neutral; abrupt smooth boundary.
A2—1 to 8 inches; dark grayish brown (10YR 4/2) stony ashy sandy loam, very dark brown (10YR 2/2) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; many roots; many very fine pores; 10 percent gravel and 10 percent stones; neutral; abrupt smooth boundary.

2C1—8 to 29 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common roots; common very fine pores; 35 percent gravel; neutral; clear wavy boundary.
2C2—29 to 60 inches; multicolored very gravelly sand; single grain; loose; 50 percent gravel; neutral.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 7 to 14 inches
Thickness of the mollic epipedon: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent

A horizon:
Value—4 to 6 dry, 2 to 4 moist
Chroma—1 to 3 dry or moist
Texture—stony ashy sandy loam
Content of gravel—0 to 15 percent
Content of cobbles—0 to 10 percent
Content of stones—0 to 10 percent

2C1 horizon:
Hue—10YR or 2.5Y
Value—5 to 8 dry, 3 to 6 moist
Chroma—2 to 4 dry or moist
Texture—loamy sand, sandy loam, coarse sandy loam, or loamy coarse sand; very gravelly or very cobbly
Content of gravel—20 to 50 percent
Content of cobbles—0 to 15 percent
Content of clay—5 to 12 percent

2C2 horizon:
Hue—10YR or 2.5Y
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 to 4 dry or moist
Texture—loamy sand, loamy coarse sand, sand, or coarse sand; very gravelly, extremely gravelly, very cobbly, or extremely cobbly
Content of gravel—25 to 50 percent
Content of cobbles—0 to 30 percent
Content of stones—0 to 30 percent
Content of clay—0 to 5 percent

Lekrem Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes
Parent material: Mixed volcanic ash (12 to 25 inches) over colluvium and glacial till from granitic rock
Slope: 15 to 65 percent
Elevation: 2,400 to 5,000 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts

Typical Pedon

Lekrem stony ashy sandy loam, in an area of Lekrem-Chumstick-Rock outcrop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 14 miles north of Winthrop, Washington; 1,800 feet east and 1,400 feet south of the northwest corner of sec. 29, T. 37 N., R. 21 E.; latitude 48 degrees 41 minutes 18 seconds north and longitude 120 degrees 14 minutes 37 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.

A—0 to 4 inches; dark grayish brown (10YR 4/2) stony ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; common fine and very fine tubular pores; 10 percent gravel, 5 percent cobbles, and 10 percent stones; slightly acid; clear smooth boundary.

Bw—4 to 16 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, dark brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; common fine tubular pores; 15 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.

2BC—16 to 29 inches; light yellowish brown (10YR 6/4) very gravelly sandy loam, yellowish brown (10YR 5/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; few fine irregular pores; 30 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.

2C1—29 to 40 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine and few medium roots; few very fine irregular pores; 40 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.

2C2—40 to 60 inches; very pale brown (10YR 7/3) very gravelly loamy coarse sand, pale brown (10YR 6/3) moist; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; 45 percent gravel and 10 percent cobbles; neutral.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 12 to 25 inches
Content of rock fragments in the particle-size control section: 35 to 65 percent

A horizon:

Value—4 to 6 dry, 3 to 5 moist
Chroma—2 or 3 dry or moist
Texture—stony or gravelly ashy sandy loam
Content of gravel—10 to 30 percent
Content of cobbles—0 to 5 percent
Content of stones—0 to 15 percent

Bw horizon:

Value—5 or 6 dry
Chroma—3 or 4 dry or moist
Texture—gravelly or very gravelly ashy sandy loam
Content of gravel—15 to 30 percent
Content of cobbles—0 to 10 percent
Content of stones—0 to 5 percent

2BC horizon:

Value—5 to 7 dry, 4 to 6 moist
Chroma—2 to 4 dry or moist

Texture—very gravelly sandy loam, very cobbly sandy loam, or very cobbly coarse sandy loam
Content of gravel—25 to 40 percent
Content of cobbles—5 to 20 percent
Content of stones—0 to 5 percent

2C horizon:
Value—5 to 7 dry, 4 to 6 moist
Chroma—2 or 3 dry, 2 to 6 moist
Texture—to a depth of 40 inches, very gravelly or very cobbly sandy loam; below a depth of 40 inches, ranges to very gravelly loamy coarse sand or very gravelly loamy sand
Content of gravel—30 to 45 percent
Content of cobbles—5 to 20 percent
Content of stones—0 to 5 percent

Leonardo Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes
Parent material: Volcanic ash (25 to 39 inches) over glacial till and colluvium
Slope: 35 to 65 percent
Elevation: 5,500 to 6,500 feet
Mean annual precipitation: 35 to 40 inches
Mean annual air temperature: 39 to 41 degrees F
Frost-free period: 80 to 100 days
Taxonomic classification: Ashy over loamy-skeletal, glassy over isotic Humic Xeric Vitricryands

Typical Pedon

Leonardo ashy fine sandy loam; North Ferry Area, Washington; on Taylor Ridge in Colville National Forest; NW¼ sec. 15, T. 38 N., R. 35 E.; latitude 48 degrees 47 minutes 36 seconds north and longitude 118 degrees 21 minutes 52 seconds west.

A1—0 to 8 inches; dark grayish brown (10YR 4/2) ashy fine sandy loam, black (10YR 2/1) moist; moderate medium granular structure; soft, friable, nonsticky and nonplastic; many fine roots; 10 percent shale fragments; moderately acid; clear wavy boundary.
A2—8 to 16 inches; dark grayish brown (10YR 4/2) ashy fine sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, friable, nonsticky and nonplastic; few fine roots; 10 percent shale fragments; moderately acid; clear wavy boundary.
AC—16 to 38 inches; brown (10YR 4/3) stony ashy fine sandy loam, dark brown (10YR 3/3) moist; single grain; loose, nonsticky and nonplastic; few fine roots; 10 percent shale fragments and 15 percent angular stones; moderately acid; clear wavy boundary.
2C—38 to 60 inches; yellowish brown (10YR 5/4) extremely stony sandy loam, brown (10YR 4/3) moist; single grain; loose, nonsticky and nonplastic; few fine roots; 20 percent shale fragments and 50 percent angular stones; moderately acid.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 25 to 39 inches

Rock fragments: 5 to 35 percent in the ashy layer and 50 to 80 percent in the lower part of the particle-size control section
Thickness of the mollic epipedon: 20 to 39 inches

A horizon:
Value—3 or 4 dry, 2 or 3 moist
Chroma—1 or 2 dry or moist

AC horizon:
Value—4 or 5 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—stony or gravelly ashy fine sandy loam

2C horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—sandy loam or fine sandy loam or the very gravelly, very stony, or extremely stony analogs of those textures

Limking Series

Soil depth: Deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, generally on southerly aspects
Parent material: Volcanic ash (14 to 30 inches) over colluvium and residuum from granitic rocks
Slope: 30 to 60 percent
Elevation: 4,000 to 5,500 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 42 to 44 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Ashy over sandy or sandy-skeletal, glassy over isotic, frigid Typic Vitrixerands

Typical Pedon

Limking stony ashy loam; Cashmere Mountain Area, Washington; 1,000 feet west and 1,340 feet north of southeast corner of sec. 1, T. 29 N., R. 21 E.; latitude 48 degrees 2 minutes 9 seconds north and longitude 120 degrees 9 minutes 26 seconds west.

Oi—1 inch to 0; slightly decomposed forest litter.
A1—0 to 4 inches; brown (10YR 5/3) stony ashy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine, fine, and medium roots; few very fine tubular pores; 10 percent gravel and 5 percent stones (2 percent surface stones); neutral; clear wavy boundary.
A2—4 to 6 inches; pale brown (10YR 6/3) ashy loam, brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; weakly smeary; common very fine and fine roots; few very fine tubular pores; 10 percent gravel; neutral; clear wavy boundary.
Bw1—6 to 13 inches; brown (7.5YR 5/4) gravelly ashy loam, dark brown (7.5YR 3/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and slightly plastic; weakly smeary; many very fine and common fine roots; few very fine tubular pores; 5 percent pumice (2 to 10 millimeters), 15 percent gravel, 5 percent cobbles, and 5 percent stones; neutral; clear wavy boundary.

Bw2—13 to 22 inches; light brown (7.5YR 6/4) very gravelly ashy sandy loam, brown (7.5YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and slightly plastic; weakly smeary; common very fine and fine roots; few very fine tubular pores; 5 percent pumice (2 to 10 millimeters), 30 percent gravel, 10 percent cobbles, and 5 percent stones; neutral; clear wavy boundary.
2BC—22 to 44 inches; light yellowish brown (2.5Y 6/4) extremely gravelly loamy sand, olive brown (2.5Y 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; 50 percent gravel, 15 percent cobbles, and 5 percent stones; neutral; gradual wavy boundary.
2C—44 to 58 inches; brownish yellow (10YR 6/6) extremely gravelly loamy coarse sand, dark yellowish brown (10YR 4/6) moist; single grain; loose; 50 percent gravel, 15 percent cobbles, and 5 percent stones; neutral.
2R—58 to 62 inches; granodiorite.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 14 to 30 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent
Depth to bedrock: 40 to 60 inches

A horizon:
Value—5 or 7 dry
Chroma—1 to 3 dry or moist

Bw horizon:
Hue—7.5YR or 10YR
Value—5 or 6 dry, 3 to 5 moist
Chroma—4 to 6 dry or moist
Texture—gravelly ashy loam, very gravelly ashy loam, gravelly ashy sandy loam, very gravelly ashy sandy loam, or very stony ashy sandy loam
Content of rock fragments—20 to 55 percent

2BC horizon:
Value—6 or 7 dry, 4 or 5 moist
Texture—very gravelly, extremely gravelly, or very cobbly loamy sand
Content of rock fragments—40 to 65 percent

2C horizon:
Hue—2.5YR or 10YR
Value—6 or 7 dry, 4 to 6 moist
Chroma—4 to 6 dry or moist
Texture—extremely gravelly loamy sand, very gravelly loamy coarse sand, extremely gravelly loamy coarse sand, or extremely cobbly sand
Content of rock fragments—50 to 70 percent

Lithic Dystrocryepts

Soil depth: Very shallow or shallow
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, shoulders, and ridges
Parent material: Volcanic ash or mixed volcanic ash (4 to 12 inches) over residuum or colluvium
Slope: 35 to 100 percent
Elevation: 5,200 to 7,800 feet
Mean annual precipitation: 25 to 80 inches

Mean annual air temperature: 35 to 41 degrees F
Frost-free period: 40 to 90 days
Taxonomic classification: Lithic Dystrocryepts

Reference Pedon

Lithic Dystrocryepts, in an area of Lithic Dystrocryepts-Rock outcrop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; 700 feet north and 500 feet west of the southeast corner of sec. 14, T. 38 N., R. 29 E.; latitude 48 degrees 47 minutes 11 seconds north and longitude 119 degrees 7 minutes 21 seconds west.

Oi—1 inch to 0; slightly decomposed mat of needles and twigs; abrupt smooth boundary.
A—0 to 4 inches; light brownish gray (10YR 6/2) very stony ashy fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; slightly smeary; many fine and medium and common coarse roots; common fine and very fine pores; 10 percent gravel, 10 percent cobbles, and 15 percent stones; strongly acid; clear wavy boundary.
Bw—4 to 10 inches; yellow (10YR 7/6) very stony ashy fine sandy loam, dark yellowish brown (10YR 4/6) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; slightly smeary; many fine and medium and common coarse roots; common fine and very fine pores; 10 percent gravel, 10 percent cobbles, and 20 percent stones; moderately acid; clear irregular boundary.
2C—10 to 19 inches; very pale brown (10YR 7/3) extremely stony sandy loam, olive brown (2.5Y 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and very fine roots; common fine pores; 30 percent gravel, 20 percent cobbles, and 20 percent stones; strongly acid.
R—19 inches; granitic bedrock.

Range in Characteristics

Depth to bedrock: 8 to 20 inches
Thickness of the material influenced by volcanic ash or mixed volcanic ash: 4 to 12 inches
Note: Volcanic ash is associated with forested areas (Andic), and mixed volcanic ash is associated with nonforested area (Vitrandic). The O horizon is not present in nonforested areas.
Soil moisture regime: Xeric in map unit 149 and udic in map units 206, 706, and 714
Thickness of the umbric epipedon: 7 to 15 inches
Note: The umbric epipedon is not present in nonforested areas.
Content of rock fragments in the particle-size control section: 20 to 80 percent
Note: Flat rock fragments, channers, and flagstones are associated with sandstone lithology. Subrounded and angular rock fragments are associated with granite and gneiss lithologies.
Note: Some pedons have a thin E horizon directly below the organic layer. The E horizon consists of 140 to 190 year old “T” or 450 to 500 year old “W” ash from Mount Saint Helens.

A horizon:
Value—3 to 6 dry, 2 to 4 moist
Chroma—1 to 6 dry or moist
Content of gravel—5 to 20 percent
Content of cobbles—5 to 15 percent
Content of stones—10 to 25 percent

Bw horizon:
Value—6 or 7 dry
Chroma—4 to 6 dry or moist

Texture—ashy fine sandy loam or ashy sandy loam with total content of rock fragments ranging from 35 to 60 percent
Content of gravel—5 to 50 percent
Content of cobbles—0 to 40 percent
Content of stones—0 to 25 percent

2C horizon:
Hue—2.5Y or 10YR
Value—5 to 7 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—sandy loam with total content of rock fragments ranging from 40 to 75 percent
Content of gravel—10 to 35 percent
Content of cobbles—0 to 30 percent
Content of stones—0 to 30 percent

Lithic Eutrocryepts

Soil depth: Very shallow or shallow
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Shoulders, ridges, and backslopes of mountains
Parent material: Volcanic ash or mixed volcanic ash (4 to 12 inches) over residuum or colluvium
Slope: 10 to 90 percent
Elevation: 4,400 to 7,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 40 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Lithic Eutrocryepts

Reference Pedon

Lithic Eutrocryepts, in an area of Lithic Eutrocryepts-Andic Eutrocryepts complex, 10 to 70 percent slopes; Okanogan National Forest Area, Washington; about 2 miles northwest of Bonaparte Lake; 400 feet north and 700 feet east of the southwest corner of sec. 6, T. 38 N., R. 30 E.; latitude 48 degrees 48 minutes 50 seconds north and longitude 119 degrees 5 minutes 42 seconds west.

A—0 to 4 inches; brown (10YR 5/3) ashy fine sandy loam, dark yellowish brown (10YR 3/6) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; moderately smeary; common very fine and fine roots; common fine irregular pores; 5 percent gravel; slightly acid; clear smooth boundary.

2Bw—4 to 16 inches; light yellowish brown (10YR 6/4) very stony sandy loam, dark yellowish brown (10YR 4/6) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; moderately smeary; common very fine, fine, medium, and coarse roots; common fine irregular pores; 10 percent gravel, 10 percent cobbles, and 15 percent stones; moderately acid; gradual wavy boundary.

2R—16 inches; granite.

Range in Characteristics

Depth to bedrock: 8 to 20 inches
Thickness of the material influenced by volcanic ash or mixed volcanic ash: 4 to 12 inches

Content of rock fragments in the particle-size control section: 15 to 70 percent throughout
Soil moisture regime: Xeric
Note: Some pedons in forested areas have an O horizon.

A horizon:
Value—4 to 6 dry, 3 or 4 moist
Chroma—2 to 6 dry or moist
Texture—ashy fine sandy loam or very stony ashy fine sandy loam with total content of rock fragments ranging from 5 to 45 percent
Content of gravel—0 to 20 percent
Content of cobbles—0 to 15 percent
Content of stones—0 to 15 percent

2Bw horizon:
Value—4 to 7 dry, 3 to 5 moist
Chroma—3 to 6 dry or moist
Texture—sandy loam with total content of rock fragments ranging from 15 to 60 percent
Content of gravel—5 to 35 percent
Content of cobbles—0 to 25 percent
Content of stones—0 to 30 percent

Lithic Haploxerepts

Soil depth: Very shallow or shallow
Drainage class: Well drained
Landscape: Foothills and mountains
Position on landscape: Ridges, shoulders, and backslopes
Parent material: Volcanic ash or mixed volcanic ash (4 to 12 inches) over residuum or colluvium
Slope: 3 to 90 percent
Elevation: 1,500 to 5,300 feet
Mean annual precipitation: 11 to 25 inches
Mean annual air temperature: 40 to 52 degrees F
Frost-free period: 90 to 150 days
Taxonomic classification: Lithic Haploxerepts

Reference Pedon

Lithic Haploxerepts, in an area of Merkel-Lithic Haploxerepts-Rock outcrop complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 7 miles northwest of Havillah, Washington; 1,700 feet east and 2,100 feet south of the northwest corner of sec. 17, T. 39 N., R. 28 E.; latitude 48 degrees 52 minutes 52 seconds north and longitude 119 degrees 20 minutes 2 seconds west.

Oi—1 inch to 0; slightly decomposed mat of needles, twigs, and grass.
A—0 to 3 inches; light gray (10YR 7/2) cobbly ashy sandy loam, pale brown (10YR 6/3) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; few fine irregular pores; 5 percent gravel, 20 percent cobbles, and 5 percent stones; neutral; abrupt smooth boundary.
Bw—3 to 12 inches; pale brown (10YR 6/3) cobbly ashy sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common medium and few fine and very fine roots; few fine irregular pores; 10 percent gravel, 20 percent cobbles, and 5 percent stones; neutral; gradual wavy boundary.

2C—12 to 18 inches; pale yellow (2.5Y 7/3) very gravelly sandy loam, light yellowish brown (2.5Y 6/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; 45 percent gravel and 10 percent cobbles; slightly acid.
2R—18 inches; granite.

Range in Characteristics

Depth to bedrock: 8 to 20 inches
Thickness of the material influenced by volcanic ash or mixed volcanic ash: 4 to 12 inches
Content of rock fragments in the particle-size control section: 20 to 60 percent
Note: The O horizon is not present in nonforested areas.

A horizon:
Value—5 to 7 dry, 4 to 6 moist
Chroma—2 or 3 dry, 3 or 4 moist
Texture—cobbly or very stony ashy sandy loam
Content of gravel—5 to 15 percent
Content of cobbles—10 to 25 percent
Content of stones—0 to 20 percent

Bw horizon:
Value—6 or 7 dry, 3 to 5 moist
Chroma—2 to 4 dry or moist
Texture—ashy sandy loam with total content of rock fragments ranging from 25 to 60 percent
Content of gravel—10 to 25 percent
Content of cobbles—10 to 25 percent
Content of stones—0 to 10 percent

2C horizon:
Hue—10YR or 2.5Y
Value—6 or 7 dry, 5 or 6 moist
Chroma—2 or 3 dry or moist
Texture—sandy loam with total content of rock fragments ranging from 25 to 60 percent
Content of gravel—10 to 45 percent
Content of cobbles—5 to 15 percent
Content of stones—0 to 10 percent

Lithic Ultic Haploxerolls

Soil depth: Very shallow or shallow
Drainage class: Well drained
Landscape: Foothills and mountains
Position on landscape: Backslopes, shoulders, and ridges
Parent material: Residuum and colluvium from metasedimentary and sedimentary rock
Slope: 35 to 90 percent
Elevation: 2,200 to 3,700 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 110 to 140 days
Taxonomic classification: Lithic Ultic Haploxerolls

Reference Pedon

Lithic Ultic Haploxerolls, in an area of Wagberg-Lithic Ultic Haploxerolls-Rock outcrop complex, 35 to 90 percent slopes; Okanogan National Forest Area, Washington; about

3 miles northeast of Conconully, Washington; 400 feet west and 2,100 feet north of the southeast corner of sec. 28, T. 36 N., R. 25 E.; latitude 48 degrees 35 minutes 22 seconds north and longitude 119 degrees 41 minutes 24 seconds west.

A—0 to 10 inches; grayish brown (10YR 5/2) very stony sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine, common medium, and few coarse roots; common fine and very fine tubular pores; 20 percent gravel, 15 percent cobbles, and 15 percent stones; neutral; clear smooth boundary.

C—10 to 15 inches; yellowish brown (10YR 5/4) very cobbly sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; few very fine pores; 20 percent gravel and 30 percent cobbles; neutral; clear wavy boundary.

R—15 inches; metasedimentary rock.

Range in Characteristics

Depth to bedrock: 8 to 20 inches
Content of rock fragments in the particle-size control section: 20 to 65 percent
Thickness of the mollic epipedon: 7 to 12 inches

A horizon:

Value—4 or 5 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Content of gravel—10 to 20 percent
Content of cobbles—5 to 20 percent
Content of stones—15 to 25 percent

C horizon:

Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 dry, 2 to 4 moist
Texture—dominantly very cobbly, very stony, or very gravelly sandy loam; in some pedons, very channery sandy loam or flaggy sandy loam
Content of gravel—20 to 40 percent
Content of cobbles—10 to 30 percent
Content of stones—0 to 25 percent
Content of channers—15 to 50 percent
Content of flagstones—0 to 15 percent

Lithic Vitricryands

Soil depth: Very shallow or shallow
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, shoulders, and ridges, generally on southerly aspects
Parent material: Volcanic ash (8 to 20 inches) over bedrock
Slope: 35 to 90 percent
Elevation: 5,200 to 7,200 feet
Mean annual precipitation: 25 to 80 inches
Mean annual air temperature: 35 to 41 degrees F
Frost-free period: 40 to 90 days
Taxonomic classification: Lithic Vitricryands

Reference Pedon

Lithic Vitricryands, in an area of Rock outcrop-Lithic Vitricryands association, 60 to 90 percent slopes; Okanogan National Forest Area, Washington; about 3 miles northwest

of Washington Pass, Washington; 300 feet east and 900 feet south of the northwest corner of sec. 12, T. 35 N., R. 17 E.; latitude 48 degrees 33 minutes 15 seconds north and longitude 120 degrees 41 minutes 10 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles, twigs, and leaves; abrupt smooth boundary.

A—0 to 4 inches; pale brown (10YR 6/3) very stony ashy sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; moderately smeary; many very fine and fine and few medium and coarse roots; few very fine irregular pores; 15 percent gravel, 10 percent cobbles, and 10 percent stones; slightly acid; clear wavy boundary.

Bw1—4 to 10 inches; light yellowish brown (10YR 6/4) very stony ashy sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; moderately smeary; many very fine and fine and few medium and coarse roots; few very fine irregular pores; 20 percent gravel, 10 percent cobbles, and 10 percent stones; slightly acid; clear wavy boundary.

Bw2—10 to 18 inches; brownish yellow (10YR 6/6) very stony ashy sandy loam, dark yellowish brown (10YR 4/6) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; moderately smeary; common very fine and fine and few medium roots flattened between stones fragments; few very fine irregular pores; 25 percent gravel, 10 percent cobbles, and 20 percent stones; slightly acid; abrupt wavy boundary.

2R—18 inches; granite.

Range in Characteristics

Depth to bedrock: 8 to 20 inches
Thickness of the material influenced by volcanic ash: 8 to 20 inches
Content of rock fragments in the particle-size control section: 25 to 60 percent

A horizon:

Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—stony ashy silt loam or very stony ashy sandy loam
Content of gravel—10 to 20 percent
Content of cobbles—5 to 15 percent
Content of stones—10 to 20 percent

Bw horizon:

Chroma—4 to 6 dry, 3 to 6 moist
Texture—ashy sandy loam with total content of rock fragments ranging from 25 to 60 percent
Content of gravel—10 to 20 percent
Content of cobbles—5 to 20 percent
Content of stones—10 to 35 percent

Longort Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, generally on southerly aspects
Parent material: Mixed volcanic ash (10 to 17 inches) over glacial till
Slope: 15 to 65 percent
Elevation: 2,600 to 4,900 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F

Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts

Typical Pedon

Longort gravelly ashy sandy loam, in an area of Longort gravelly ashy sandy loam, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 5 miles northeast of Mazama, Washington; about 300 feet west and 1,500 feet north of the southeast corner of sec. 4, T. 36 N., R. 20 E.; latitude 48 degrees 38 minutes 50 seconds north and longitude 120 degrees 20 minutes 21 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.

A—0 to 5 inches; brown (10YR 4/3) gravelly ashy sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common very fine and fine pores; 15 percent gravel and 5 percent cobbles; slightly acid; clear smooth boundary.

Bw—5 to 17 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, dark brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common very fine and fine pores; 20 percent gravel and 5 percent cobbles; slightly acid; gradual wavy boundary.

2C—17 to 37 inches; light yellowish brown (2.5Y 6/3) very gravelly sandy loam, light olive brown (2.5Y 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; few fine pores; 35 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.

2Cd1—37 to 47 inches; light yellowish brown (2.5Y 6/3) very gravelly sandy loam, light olive brown (2.5Y 5/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine roots; few very fine pores; common fine and medium distinct irregular dark yellowish brown (10YR 4/6, moist) stains; 35 percent gravel and 5 percent cobbles; slightly acid; gradual wavy boundary.

2Cd2—47 to 60 inches; light yellowish brown (2.5Y 6/4) very cobbly sandy loam, light olive brown (2.5Y 5/4) moist; massive; hard, friable, nonsticky and slightly plastic; few very fine roots; many fine and medium distinct irregular dark yellowish brown (10YR 4/6, moist) stains; 35 percent gravel and 20 percent cobbles; slightly acid.

Range in Characteristics

Depth to densic material: 25 to 40 inches
Thickness of the material influenced by mixed volcanic ash: 10 to 17 inches
Content of rock fragments in the particle-size control section: 35 to 50 percent

A horizon:
- Value—4 to 6 dry, 2 or 3 moist
- Chroma—2 or 3 dry or moist
- Content of gravel—15 to 25 percent
- Content of cobbles—0 to 5 percent

Bw horizon:
- Value—5 or 6 dry, 3 or 4 moist
- Chroma—2 or 3 dry or moist
- Texture—gravelly or very gravelly ashy sandy loam
- Content of gravel—15 to 25 percent
- Content of cobbles—2 to 15 percent

2C horizon:
- Hue—2.5Y or 10YR
- Value—5 or 6 dry, 4 or 5 moist

Chroma—2 or 3 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—25 to 35 percent
Content of cobbles—10 to 20 percent

2Cd horizon:
Hue—2.5Y or 10YR
Value—5 or 6 dry, 4 or 5 moist,
Chroma—3 or 4 dry, 2 to 4 moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—30 to 45 percent
Content of cobbles—10 to 25 percent

Longswamp Series

Soil depth: Very deep
Drainage class: Moderately well drained
Landscape: Mountains
Position on landscape: Footslopes
Parent material: Mixed volcanic ash (15 to 20 inches) over glacial till and alluvium
Slope: 15 to 35 percent
Elevation: 3,600 to 5,500 feet
Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 37 to 43 degrees F
Frost-free period: 70 to 120 days
Taxonomic classification: Fine-loamy, isotic Vitrandic Haplocryolls

Typical Pedon

Longswamp ashy loam, in an area of Toats-Longswamp complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 11 miles west of Loomis, Washington; 2,400 feet north and 1,000 feet west of the southeast corner of sec. 20, T. 39 N., R. 24 E.; latitude 48 degrees 51 minutes 51 seconds north and longitude 119 degrees 50 minutes 48 seconds west.

A1—0 to 7 inches; very dark grayish brown (10YR 3/2) ashy loam, black (10YR 2/1) moist; moderate fine and medium subangular blocky structure parting to moderate fine granular; soft, very friable, nonsticky and nonplastic; common very fine, fine, and medium and few coarse roots; common very fine and fine pores; 5 percent gravel; neutral; clear smooth boundary.

A2—7 to 20 inches; very dark grayish brown (10YR 3/2) ashy loam, black (10YR 2/1) moist; moderate fine and medium subangular blocky structure parting to moderate fine granular; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; common very fine and fine pores; 5 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.

2AC—20 to 25 inches; light brownish gray (10YR 5/2) cobbly sandy clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and medium and few coarse roots; common very fine and fine pores; 15 percent gravel, 10 percent cobbles, and 5 percent stones; neutral; clear wavy boundary.

2C—25 to 39 inches; grayish brown (2.5Y 5/2) gravelly sandy clay loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, firm, slightly sticky and slightly plastic; common very fine and fine and few medium roots; few very fine and fine pores; common fine and medium prominent strong brown (7.5YR 5/6) redoximorphic concentrations; 25 percent gravel, 5 percent cobbles, and 5 percent stones; neutral; clear wavy boundary.

3Cg—39 to 60 inches; light brownish gray (2.5Y 6/2) gravelly silt loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, firm, slightly sticky and slightly plastic; few fine and medium roots; few very fine pores; common medium and coarse prominent strong brown (7.5YR 5/6) redoximorphic concentrations; 15 percent gravel and 5 percent cobbles; neutral.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 15 to 20 inches
Content of rock fragments in the particle-size control section: 15 to 25 percent
Thickness of the mollic epipedon: 16 to 25 inches
Seasonal high water table: Present in spring
Depth to redoximorphic features: 25 to 45 inches

A horizon:
Chroma—1 or 2 moist
Content of gravel—0 to 5 percent

2AC horizon:
Value—4 or 5 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—cobbly sandy clay loam, gravelly loam, or clay loam
Content of gravel—5 to 15 percent
Content of cobbles—0 to 10 percent
Content of stones—0 to 5 percent

2C horizon:
Hue—2.5Y or 10YR
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—gravelly sandy clay loam, gravelly loam, or clay loam
Content of gravel—15 to 25 percent
Content of cobbles—0 to 5 percent
Content of stones—0 to 5 percent

3Cg horizon:
Hue—2.5Y or 10YR
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—gravelly silt loam, gravelly clay loam, or gravelly sandy clay loam
Content of gravel—15 to 25 percent
Content of cobbles—0 to 5 percent
Content of stones—0 to 5 percent

Longswamp Taxadjunct

Soil depth: Moderately deep
Drainage class: Moderately well drained
Landscape: Foothills and mountains
Position on landscape: Sideslopes and backslopes
Parent material: Mixed volcanic ash (12 to 20 inches) over glacial till
Slope: 15 to 35 percent
Elevation: 3,600 to 4,800 feet
Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 85 to 120 days
Taxonomic classification: Coarse-loamy, isotic, frigid Vitrandic Haploxerolls

Typical Pedon

Longswamp Taxadjunct ashy loam, in an area of Longswamp Taxadjunct ashy loam, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 2 miles north of Conconully, Washington; 2,000 feet east and 1,200 feet south of the northwest corner of sec. 30, T. 36 N., R. 25 E.; latitude 48 degrees 35 minutes 40 seconds north and longitude 119 degrees 44 minutes 42 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, twigs, and leaves; clear smooth boundary.

A1—0 to 6 inches; very dark grayish brown (10YR 3/2) ashy loam, black (10YR 2/1) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common very fine and fine irregular pores; 5 percent gravel; neutral; clear wavy boundary.

A2—6 to 12 inches; dark grayish brown (10YR 4/2) ashy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine irregular pores; 10 percent gravel; neutral; clear smooth boundary.

Bw—12 to 15 inches; grayish brown (2.5Y 5/2) gravelly ashy sandy loam, dark grayish brown (2.5Y 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine irregular pores; 15 percent gravel; neutral; clear smooth boundary.

2C—15 to 25 inches; grayish brown (2.5Y 5/2) very gravelly sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; few very fine and fine irregular pores; 30 percent gravel, 5 percent cobbles, and 5 percent stones; neutral; clear wavy boundary.

2Cd1—25 to 36 inches; grayish brown (2.5Y 5/2) very gravelly sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine and fine irregular pores; 35 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.

2Cd2—36 to 60 inches; grayish brown (2.5Y 5/2) gravelly clay loam, dark grayish brown (2.5Y 4/2) moist; common fine and medium distinct dark yellowish brown (10YR 4/6) irregular redoximorphic concentrations in the soil matrix; massive; hard, friable, sticky and plastic; few very fine and fine roots; few very fine and fine irregular pores; discontinuous distinct clay films in pores; 25 percent gravel; neutral.

Range in Characteristics

Depth to densic material: 25 to 40 inches
Thickness of the material influenced by mixed volcanic ash: 12 to 20 inches
Thickness of the mollic epipedon: 10 to 20 inches
Content of rock fragments in the particle-size control section: 25 to 50 percent
Seasonal high water table: Present in the spring
Depth to redoximorphic features: 30 to 45 inches

A horizon:
Value—3 or 4 dry, 2 or 3 moist
Chroma—1 or 2 dry or moist
Content of gravel—0 to 15 percent

Bw horizon:
Hue—2.5Y or 10YR
Value—5 or 6 dry, 3 or 4 moist

Chroma—2 or 3 dry or moist
Texture—gravelly ashy sandy loam or cobbly ashy sandy loam
Content of gravel—10 to 30 percent
Content of cobbles—0 to 10 percent
Content of stones—0 to 5 percent

2C horizon:
Hue—2.5Y or 10YR
Value—5 to 7 dry, 4 to 6 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly loam, very cobbly loam, very cobbly sandy loam, or very gravelly sandy loam
Content of gravel—20 to 40 percent
Content of cobbles—0 to 15 percent
Content of stones—0 to 10 percent

2Cd horizon:
Hue—2.5Y or 10YR
Value—5 to 7 dry, 4 to 6 moist
Chroma—2 or 3 dry or moist
Texture—cobbly loam, very cobbly sandy loam, very gravelly sandy loam, gravelly sandy loam, or gravelly clay loam
Content of gravel—20 to 50 percent
Content of cobbles—0 to 20 percent
Content of stones—0 to 15 percent

The Longswamp soils in map unit 218 are a taxadjunct to the Longswamp series. The Longswamp series is classified as fine-loamy Haplocryolls. The Longswamp soils in map unit 218 are coarse loamy, frigid Haploxerolls.

Louploup Series

Soil depth: Deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Footslopes, backslopes, and till plains
Parent material: Volcanic ash (14 to 30 inches) over glacial till
Slope: 3 to 35 percent
Elevation: 3,000 to 5,100 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Ashy over loamy, glassy over isotic, frigid Typic Vitrixerands

Typical Pedon

Louploup ashy fine sandy loam, in an area of Nevine-Louploup complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 5 miles northwest of Bodie, Washington; 1,300 feet east and 2,200 feet north of the southwest corner of sec. 5, T. 39 N., R. 31 E.; latitude 48 degrees 54 minutes 10 seconds north and longitude 118 degrees 56 minutes 30 seconds west.

Oi—2 inches to 0; slightly decomposed grass stems, leaves, twigs, and needles.
A—0 to 6 inches; very pale brown (10YR 7/3) ashy fine sandy loam, brown (10YR 4/3) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and common fine roots; few fine pores; 10 percent gravel; slightly acid; gradual smooth boundary.

Bw—6 to 21 inches; pale brown (10YR 6/3) ashy fine sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and few medium roots; few fine pores; 5 percent gravel; slightly acid; gradual wavy boundary.
2CB—21 to 41 inches; light yellowish brown (10YR 6/4) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; few fine and coarse roots; 15 percent gravel; neutral; gradual wavy boundary.
2Cd—41 to 60 inches; light brownish gray (10YR 6/2) gravelly sandy loam, dark grayish brown (10YR 4/2) moist; massive; hard, friable, slightly sticky and nonplastic; few medium roots; 20 percent gravel and 10 percent cobbles; neutral.

Range in Characteristics

Depth to densic material: 40 to 50 inches
Thickness of the material influenced by volcanic ash: 14 to 30 inches
Rock fragments: 0 to 10 percent in the volcanic ash layer and 15 to 35 percent in the upper part of the glacial till substratum
Note: Some pedons have a thin C horizon directly below the organic layer. The C horizon consists of a 140 to 190 year old “T” or 450 to 500 year old “W” ash from Mount Saint Helens.

A horizon:
Value—5 to 7 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Content of gravel—0 to 10 percent

Bw horizon:
Value—6 or 7 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Content of gravel—0 to 10 percent

2CB horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 to 4 dry or moist
Texture—sandy loam or gravelly sandy loam
Content of gravel—10 to 20 percent
Content of cobbles—0 to 5 percent

2Cd horizon:
Hue—10YR or 2.5Y
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 to 4 dry or moist
Texture—gravelly sandy loam or gravelly coarse sandy loam
Content of gravel—15 to 30 percent
Content of cobbles—5 to 10 percent
Content of stones—0 to 5 percent

Manley Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and footslopes
Parent material: Volcanic ash (14 to 25 inches) over glacial till
Slope: 0 to 65 percent
Elevation: 4,200 to 5,700 feet

Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 43 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Ashy over loamy-skeletal, glassy over isotic Xeric Vitricryands

Typical Pedon

Manley ashy fine sandy loam (fig. 7), in an area of Manley ashy fine sandy loam, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 2.5 miles southeast of Havillah, Washington; 2,000 feet west and 2,100 feet south of the northeast corner of sec. 17, T. 38 N., R. 29 E.; latitude 48 degrees 47 minutes 35 seconds north and longitude 119 degrees 11 minutes 42 seconds west.

Oi—3 inches to 1; slightly decomposed needles and twigs; abrupt smooth boundary.
Oe—1 inch to 0; moderately decomposed needles and twigs; abrupt smooth boundary.

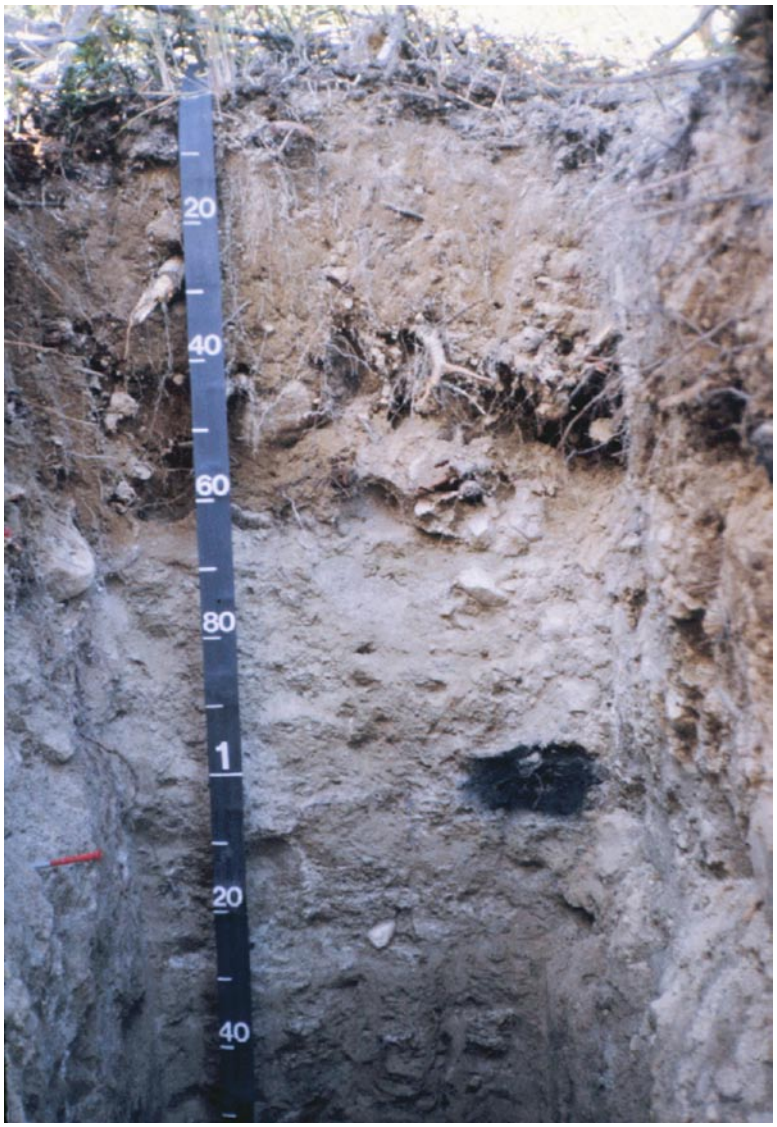

Figure 7.—Profile of Manley ashy fine sandy loam. The soil has 60 centimeters (24 inches) of volcanic ash over gray glacial till. Scale is in centimeters.

C—0 to 2 inches; white (10YR 8/1) ashy fine sandy loam, brown (10YR 5/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; smeary; common very fine and fine roots; few fine pores; moderately acid; clear wavy boundary.
2Bw1—2 to 13 inches; pale brown (10YR 6/3) ashy fine sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure parting to weak fine subangular blocky; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine roots; common fine pores; 5 percent gravel; slightly acid; gradual wavy boundary.
2Bw2—13 to 21 inches; light yellowish brown (10YR 6/4) ashy fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine roots; common fine pores; 5 percent gravel; slightly acid; clear wavy boundary.
3C—21 to 34 inches; light gray (5Y 7/2) very cobbly sandy loam, olive gray (5Y 5/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine and fine roots; few fine pores; 25 percent gravel, 25 percent cobbles, and 5 percent stones; slightly acid; gradual wavy boundary.
3Cd—34 to 60 inches; light gray (5Y 7/2) very gravelly sandy loam, olive gray (5Y 4/2) moist; massive; hard, friable, nonsticky and nonplastic; few very fine roots; few fine pores; 40 percent gravel, 10 percent cobbles, and 5 percent stones; slightly acid.

Range in Characteristics

Depth to densic material: 20 to 40 inches
Thickness of the material influenced by volcanic ash: 14 to 25 inches
Rock fragments: 0 to 10 percent in the volcanic ash layer and 35 to 70 percent in the upper part of the compact glacial till
Note: Not all pedons have the thin C horizon directly below the organic layer. The C horizon consists of 450 to 500 year old “W” ash from Mount Saint Helens.

2Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Content of gravel—0 to 15 percent

3C horizon:
Hue—2.5Y or 5Y
Value—6 or 7 dry, 4 to 6 moist
Chroma—2 to 4 dry or moist
Texture—very cobbly or very gravelly sandy loam
Content of gravel—20 to 45 percent
Content of cobbles—5 to 25 percent
Content of stones—0 to 10 percent

3Cd horizon:
Hue—2.5Y or 5Y
Value—6 or 7 dry, 4 to 6 moist
Chroma—2 to 4 dry or moist
Texture—very cobbly sandy loam, very gravelly sandy loam, or very gravelly loamy sand
Content of gravel—25 to 50 percent
Content of cobbles—5 to 25 percent
Content of stones—0 to 10 percent

Martella Series

Soil depth: Very deep
Drainage class: Moderately well drained

Landscape: Terraces
Position on landscape: Treads and risers
Parent material: Volcanic ash (7 to 14 inches) over glaciolacustrine deposits
Slope: 0 to 20 percent
Elevation: 3,400 to 4,800 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Fine-silty, isotic, frigid Andic Haploxeralfs

Typical Pedon

Martella ashy fine sandy loam, in an area of Martella ashy fine sandy loam, 0 to 20 percent slopes; Okanogan National Forest Area, Washington; about 2.5 miles south of Wauconda, Washington; 600 feet west and 2,400 feet south of the northeast corner of sec. 21, T. 37 N., R. 30 E.; latitude 48 degrees 41 minutes 26 seconds north and longitude 119 degrees 2 minutes 5 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.
A—0 to 5 inches; pale brown (10YR 6/3) ashy fine sandy loam, dark brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; few fine pores; slightly acid; clear broken boundary.
Bw—5 to 13 inches; pale brown (10YR 6/3) ashy fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; weakly smeary; many very fine and fine and common medium and coarse roots; few fine pores; neutral; clear wavy boundary.
2E/Bt—13 to 22 inches; E part (60 percent) light gray (10YR 7/2) silt loam skeletans on faces of peds, grayish brown (10YR 5/2) moist; Bt part (40 percent) brown (10YR 5/3) silt loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine and few medium roots; few fine tubular pores; 5 percent gravel; slightly acid; clear wavy boundary.
2Bt—22 to 43 inches; pale brown (10YR 6/3) silt loam, brown (10YR 5/3) moist; moderate medium and coarse angular blocky structure; hard, firm, moderately sticky and moderately plastic; few very fine and fine roots; common very fine tubular pores; 5 percent gravel; common distinct clay films on faces of peds and in pores; neutral; clear wavy boundary.
2C—43 to 60 inches; pale brown (10YR 6/3) very fine sandy loam, brown (10YR 5/3) moist; massive and laminated; slightly hard, friable, slightly sticky and nonplastic; few very fine roots; few very fine and fine pores; 10 percent gravel; neutral.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 7 to 14 inches
Rock fragments: 0 to 5 percent gravel
Seasonal high water table: Present in winter and spring

A horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist

Bw horizon:
Chroma—3 or 4 dry or moist

2E/Bt horizon:
Value (E part)—6 or 7 dry, 5 or 6 moist

Chroma (E part)—2 or 3 dry or moist
Value (Bt part)—5 or 6 dry, 4 or 5 moist
Chroma (Bt part)—2 or 3 dry or moist
Texture—silt loam or silty clay loam
Content of gravel—0 to 5 percent

2Bt horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—silt loam or silty clay loam
Content of gravel—0 to 5 percent

2C horizon:
Hue—10YR or 2.5Y
Value—5 to 7 dry, 4 to 6 moist
Chroma—2 to 4 dry or moist
Texture—very fine sandy loam, silt loam, or silty clay loam; stratified in some pedons
Content of gravel—0 to 5 percent

McCay Series

Soil depth: Deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes
Parent material: Volcanic ash (7 to 14 inches) over colluvium from granitic rock
Slope: 15 to 65 percent
Elevation: 6,000 to 7,000 feet
Mean annual precipitation: 35 to 45 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 80 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Andic Dystrocryepts

Typical Pedon

McCay gravelly ashy sandy loam, in an area of McCay gravelly ashy sandy loam, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 7 miles northwest of Conconully, Washington, on Forest Service road 37; sec. 22, T. 36 N., R. 29 E.; latitude 48 degrees 36 minutes 39 seconds north and longitude 119 degrees 56 minutes 20 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.
C—0 to 1 inch; white (10YR 8/1) ashy fine sandy loam, grayish brown (10YR 5/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium and coarse roots; common very fine and fine pores; moderately acid; clear wavy boundary.
2Bw1—1 to 4 inches; brown (7.5YR 4/3) gravelly ashy sandy loam, dark brown (7.5YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine, common medium, and few coarse roots; common very fine and fine pores; 15 percent gravel and 5 percent cobbles; moderately acid; clear wavy boundary.
2Bw2—4 to 13 inches; brown (7.5YR 4/4) gravelly ashy sandy loam, dark brown (7.5YR 3/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine, common

medium, and few coarse roots; common very fine and fine pores; 15 percent gravel and 5 percent cobbles; moderately acid; clear wavy boundary.

3BC—13 to 24 inches; light yellowish brown (10YR 6/4) very gravelly sandy loam, yellowish brown (10YR 5/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; common fine pores; 30 percent gravel and 5 percent cobbles; slightly acid; clear smooth boundary.

3C—24 to 45 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few fine pores; 45 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.

3Cr—45 inches; weathered granite.

Range in Characteristics

Depth to bedrock: 40 to 60 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 50 percent
Soil moisture regime: Udic

C horizon:
Value—7 or 8 dry, 5 or 6 moist

2Bw1 horizon:
Value—4 to 6 dry, 3 or 4 moist
Chroma—2 to 4 dry or moist
Content of gravel—15 to 25 percent
Content of cobbles—0 to 5 percent

2Bw2 horizon:
Hue—10YR or 7.5YR
Value—4 to 6 dry, 3 or 4 moist
Chroma—3 or 4 dry, 2 to 4 moist
Texture—gravelly ashy sandy loam or ashy sandy loam
Content of gravel—5 to 25 percent
Content of cobbles—0 to 5 percent

3BC horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—30 to 40 percent
Content of cobbles—5 to 20 percent

3C horizon:
Hue—2.5Y or 10YR
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—30 to 45 percent
Content of cobbles—5 to 20 percent

Merkel Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Footslopes and backslopes

Parent material: Mixed volcanic ash (10 to 30 inches) over granitic glacial till
Slope: 5 to 65 percent
Elevation: 2,800 to 5,100 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 39 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Dystroxerepts

Typical Pedon

Merkel ashy sandy loam; Colville Indian Reservation, Washington; 400 feet north and 1,100 feet west of the southeast corner of sec. 6, T. 34 N., R. 31 E.; latitude 48 degrees 28 minutes 9 seconds north and longitude 118 degrees 57 minutes 25 seconds west.

Oi—1 inch to 0; slightly decomposed mat of needles, twigs, and bark.
A—0 to 6 inches; brown (10YR 5/3) ashy sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium roots; common very fine and fine irregular pores; 10 percent gravel; moderately acid; gradual wavy boundary.
Bw1—6 to 12 inches; yellowish brown (10YR 5/4) gravelly ashy sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine, fine, and medium roots; common very fine and fine irregular pores; 20 percent gravel; moderately acid; gradual wavy boundary.
Bw2—12 to 29 inches; yellowish brown (10YR 5/4) gravelly ashy sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine, fine, and medium roots; common very fine and fine irregular pores; 25 percent gravel, 5 percent cobbles, and 2 percent stones; moderately acid; clear wavy boundary.
2BC—29 to 35 inches; light yellowish brown (10YR 6/4) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine, fine, medium, and coarse roots; few very fine and fine tubular pores; 40 percent gravel, 5 percent cobbles, and 5 percent stones; neutral; clear wavy boundary.
2Cd—35 to 60 inches; pale brown (10YR 6/3) dense glacial till that crushes to very gravelly coarse sandy loam, brown (10YR 5/3) moist; massive; hard, friable, nonsticky and nonplastic; few very fine and fine roots; few very fine and fine tubular pores; 35 percent gravel, 15 percent cobbles, and 5 percent stones; slightly acid.

Range in Characteristics

Depth to densic material: 20 to 40 inches
Thickness of the material influenced by mixed volcanic ash: 10 to 30 inches
Content of rock fragments in the particle-size control section: 35 to 75 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—gravelly ashy sandy loam, cobbly ashy sandy loam, or ashy sandy loam
Content of gravel—20 to 40 percent
Content of cobbles—0 to 5 percent
Content of stones—0 to 5 percent

Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist

Texture—gravelly, very gravelly, or very cobbly ashy sandy loam
Content of gravel—5 to 25 percent
Content of cobbles—0 to 20 percent
Content of stones—0 to 5 percent

2BC horizon:
Hue—10YR or 2.5Y
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 to 4 dry or moist
Texture—very gravelly, very cobbly, extremely gravelly, or extremely cobbly sandy loam
Content of gravel—25 to 45 percent
Content of cobbles—5 to 20 percent
Content of stones—5 to 10 percent

2Cd horizon:
Hue—10YR or 2.5Y
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 to 4 dry or moist
Texture to a depth of 35 inches—sandy loam or coarse sandy loam; very gravelly, very cobbly, extremely gravelly, or extremely cobbly
Texture below a depth of 35 inches—loamy sand or loamy coarse sand; very gravelly, very cobbly, extremely gravelly, or extremely cobbly
Content of gravel—25 to 45 percent
Content of cobbles—10 to 25 percent
Content of stones—5 to 10 percent

Merkel Taxadjunct

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, shoulders, and broad ridges
Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium and residuum
Slope: 15 to 35 percent
Elevation: 2,800 to 4,200 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts

Typical Pedon

Merkel Taxadjunct very stony ashy fine sandy loam, in an area of Merkel-Lithic Xerochrepts-Rock outcrop complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 4.5 miles southeast of Havillah, Washington; 900 feet south and 900 feet west of the northeast corner of sec. 21, T. 38 N., R. 29 E.; latitude 48 degrees 46 minutes 55 seconds north and longitude 119 degrees 10 minutes 2 seconds west.

Oi—3 inches to 1; slightly decomposed mat of twigs, needles, and leaves; clear smooth boundary.
Oe—1 inch to 0; moderately decomposed twigs, needles, and leaves; abrupt smooth boundary.
C—0 to 1 inch; white (10YR 8/1) stony ashy silt loam, light brownish gray (10YR 6/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium roots; many very

fine irregular pores; 5 percent gravel, 5 percent cobbles, and 10 percent stones; slightly acid; clear wavy boundary.

2A—1 to 4 inches; pale brown (10YR 6/3) very stony ashy fine sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine, common medium and coarse, and few very coarse roots; many fine irregular pores; 15 percent gravel, 5 percent cobbles, and 15 percent stones; NaF pH 10.5; slightly acid; clear smooth boundary.

2Bw—4 to 11 inches; light yellowish brown (10YR 6/4) very stony ashy fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium and coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine, common medium and coarse, and few very coarse roots; many fine irregular pores; 10 percent gravel, 20 percent cobbles, and 20 percent stones; NaF pH 10.5; slightly acid; clear smooth boundary.

3C1—11 to 23 inches; light brownish gray (2.5Y 6/2) extremely stony coarse sandy loam, grayish brown (2.5Y 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common fine irregular pores; 20 percent gravel, 25 percent cobbles, and 20 percent stones; slightly acid; gradual wavy boundary.

3C2—23 to 32 inches; light gray (2.5Y 7/2) extremely stony coarse sandy loam, light brownish gray (2.5Y 6/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine roots; 25 percent gravel, 20 percent cobbles, and 25 percent stones; slightly acid; abrupt smooth boundary.

3R—32 inches; granite.

Range in Characteristics

Thickness of the material influenced by volcanic ash and loess: 7 to 14 inches
Depth to bedrock: 20 to 40 inches
Content of rock fragments in the particle-size control section: 45 to 80 percent

C horizon:

Value—7 or 8 dry
Content of gravel—0 to 5 percent
Content of cobbles—0 to 5 percent
Content of stones—5 to 15 percent

2A horizon:

Value—5 or 6 dry, 3 or 4 moist
Chroma—2 to 4 dry or moist
Content of gravel—10 to 15 percent
Content of cobbles—5 to 15 percent
Content of stones—15 to 25 percent

2Bw horizon:

Chroma—3 or 4 dry or moist
Content of gravel—10 to 15 percent
Content of cobbles—10 to 25 percent
Content of stones—15 to 25 percent

3C horizon:

Hue—10YR or 2.5Y
Value—6 or 7 dry, 5 or 6 moist
Chroma—2 to 4 dry or moist
Content of gravel—15 to 30 percent
Content of cobbles—20 to 35 percent
Content of stones—15 to 30 percent

The Merkel soil in map unit 231 is a taxadjunct to the Merkel series. The Merkel series is classified as Dystroxerepts. The Merkel soil in map unit 231 is classified as a Haploxerept.

Midpeak Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Upper back slopes, shoulders, and ridges, generally on southerly aspects
Parent material: Mixed volcanic ash (7 to 15 inches) over colluvium and residuum from volcanic and sedimentary rock
Slope: 35 to 65 percent
Elevation: 2,250 to 4,750 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Haploxerolls

Typical Pedon

Midpeak gravelly ashy sandy loam, in an area of Midpeak-Johntom-Rock outcrop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 2 miles north of Mazama, Washington; 1,500 feet east and 2,200 feet north of the southwest corner of sec. 13, T. 36 N., R. 19 E.; latitude 48 degrees 37 minutes 13 seconds north and longitude 120 degrees 25 minutes 8 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.
A1—0 to 6 inches; grayish brown (10YR 5/2) gravelly ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common very fine and fine irregular pores; 20 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
A2—6 to 15 inches; brown (10YR 5/3) very gravelly ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common very fine and fine irregular pores; 30 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
2Bw—15 to 23 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine, fine, and medium roots; few fine irregular pores; 40 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
2C—23 to 36 inches; brown (7.5YR 5/3) extremely gravelly sandy loam, dark brown (7.5YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; few very fine irregular pores; 55 percent gravel and 5 percent cobbles; slightly acid.
2R—36 inches; fractured breccia.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the material influenced by mixed volcanic ash: 7 to 15 inches
Content of rock fragments in the particle-size control section: 40 to 70 percent
Thickness of the mollic epipedon: 7 to 15 inches

A horizon:
Hue—7.5YR or 10YR
Value—4 or 5 dry
Chroma—2 or 3 dry or moist
Content of gravel—15 to 30 percent
Content of cobbles—0 to 5 percent

2Bw horizon:
Hue—7.5YR or 10YR
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—30 to 40 percent
Content of cobbles—5 to 20 percent

2C horizon:
Hue—5YR, 7.5YR, or 10YR
Value—4 to 6 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly, very cobbly, or extremely gravelly sandy loam
Content of gravel—30 to 55 percent
Content of cobbles—5 to 20 percent

Mineral Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes
Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium and residuum from granitic rock
Slope: 15 to 65 percent
Elevation: 2,500 to 5,900 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 41 to 46 degrees F
Frost-free period: 90 to 130 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Haploxerolls

Typical Pedon

Mineral stony ashy loam; Colville Indian Reservation, Washington; about 5 miles northeast of Disautel, Washington; 550 feet north and 100 feet west of the southeast corner of sec. 34, T. 34 N., R. 29 E.; latitude 48 degrees 23 minutes 52 seconds north and longitude 119 degrees 9 minutes 7 seconds west.

Oi—1 inch to 0; slightly decomposed mat of organic matter consisting of needles, leaves, and twigs; abrupt wavy boundary.
A—0 to 6 inches; grayish brown (10YR 5/2) stony ashy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine and few medium roots; common very fine and fine irregular pores; 20 percent gravel and 5 percent stones; neutral; clear wavy boundary.
Bw—6 to 12 inches; pale brown (10YR 6/3) very gravelly ashy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine, fine, medium, and coarse roots; common very fine irregular pores; 30 percent gravel and 10 percent cobbles; neutral; gradual wavy boundary.

2C—12 to 23 inches; very pale brown (10YR 7/3) very stony sandy loam, brown (10YR 5/3) moist; massive; hard, friable, slightly sticky and nonplastic; common very fine and fine and few medium roots; common very fine and fine irregular pores; 30 percent gravel, 10 percent cobbles, and 10 percent stones; neutral; abrupt wavy boundary.
2R—23 inches; quartz monzonite.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 7 to 14 inches
Thickness of the mollic epipedon: 7 to 12 inches
Depth to bedrock: 20 to 40 inches
Content of rock fragments in the particle-size control section: 40 to 65 percent

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3 dry or moist
Content of gravel—15 to 30 percent
Content of cobbles—5 to 10 percent
Content of stones—0 to 10 percent

Bw horizon:
Value—5 to 7 dry, 3 to 5 moist
Chroma—3 or 4 dry or moist
Texture—very gravelly ashy loam, very cobbly ashy sandy loam, or very stony ashy sandy loam
Content of gravel—20 to 40 percent
Content of cobbles—5 to 25 percent
Content of stones—5 to 20 percent

2C horizon:
Value—6 or 7 dry, 3 to 5 moist
Chroma—3 or 4 dry or moist
Texture—very stony or very cobbly sandy loam
Content of gravel—20 to 30 percent
Content of cobbles—10 to 25 percent
Content of stones—5 to 20 percent

Molson Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes
Parent material: Volcanic ash (14 to 20 inches) over glacial till
Slope: 25 to 40 percent
Elevation: 1,900 to 4,500 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 95 to 130 days
Taxonomic classification: Ashy over loamy, glassy over mixed, superactive, frigid Humic Vitrixerands

Typical Pedon

Molson ashy silt loam; Okanogan County Area, Washington; about 3/8 of a mile northeast of the junction of Lemansky Lake and Pine Creek roads; 1,690 feet south and 1,350 feet west of the northeast corner of sec. 1, T. 36 N., R. 25 E.; latitude

48 degrees 37 minutes 51 seconds north and longitude 120 degrees 38 minutes 0 seconds west.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) ashy silt loam, black (10YR 2/1) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many roots; many very fine pores; neutral; clear smooth boundary.

A—8 to 18 inches; very dark grayish brown (10YR 3/2) ashy silt loam, black (10YR 2/1) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common roots; many very fine and fine pores; neutral; gradual smooth boundary.

2Bw—18 to 42 inches; yellowish brown (10YR 5/4) gravelly silt loam, dark yellowish brown (10YR 3/4) moist; weak medium prismatic structure; slightly hard, very friable, slightly sticky and slightly plastic; common roots; many fine pores; 30 percent gravel; neutral; clear smooth boundary.

2C1—42 to 50 inches; light gray (2.5Y 7/2) gravelly silt loam, olive brown (2.5Y 4/4) moist; massive; hard, firm, slightly sticky and slightly plastic; few roots; many fine pores; 30 percent gravel; slightly effervescent; slightly alkaline; diffuse wavy boundary.

2C2—50 to 60 inches; light gray (5Y 7/2) gravelly loam, light olive brown (2.5Y 5/3) moist; massive; slightly cemented, very hard, very firm, slightly sticky and slightly plastic; few roots; few fine pores; 30 percent gravel; slightly alkaline.

Range in Characteristics

Depth to till: 14 to 20 inches
Thickness of the material influenced by volcanic ash: 14 to 20 inches
Thickness of the mollic epipedon: 14 to 20 inches

Ap and A horizons:
- Value—3 or 4 dry, 2 or 3 moist
- Chroma—1 or 2 dry or moist
- Content of rock fragments—0 to 15 percent
- Content of gravel—0 to 10 percent
- Content of cobbles—0 to 5 percent
- Content of stones—5 to 15 percent

2Bw horizon:
- Value—4 or 5 dry, 3 or 4 moist
- Chroma—3 or 4 dry or moist
- Texture—silt loam, loam, gravelly silt loam, or gravelly loam
- Content of rock fragments—0 to 30 percent
- Content of gravel—15 to 30 percent
- Content of cobbles—0 to 5 percent

2C horizon:
- Hue—10YR, 2.5Y, or 5Y
- Value—5 to 7 dry, 3 to 5 moist
- Chroma—2 to 4 dry or moist
- Texture—gravelly loam or gravelly silt loam
- Content of rock fragments—15 to 30
- Content of gravel—15 to 30 percent
- Content of cobbles—0 to 5 percent

Muckamuck Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Terraces and alluvial bottoms

Position on landscape: Alluvial bottoms and low stream terraces
Parent material: Mixed alluvium
Slope: 0 to 3 percent
Elevation: 1,400 to 2,500 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 100 to 125 days
Taxonomic classification: Fine-loamy, mixed, superactive, frigid Fluventic Haploxerolls

Typical Pedon

Muckamuck silt loam. This pedon was identified as a Bosel Variant soil in the 1980 soil survey of Okanogan County Area, Washington. It is now correlated as the model pedon for the Muckamuck series. The pedon is in the area for the current soil survey of Okanogan County Area, Washington, about 350 feet north of the junction of Harts Pass, Early Winters, and Winthrop roads and 50 feet west of Harts Pass road; NW$^1/_4$SE$^1/_4$ sec. 25, T. 36 N., R. 19 E.; latitude 48 degrees 35 minutes 22 seconds north and longitude 120 degrees 24 minutes 44 seconds west.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate coarse granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine to medium roots; many very fine and fine pores; slightly acid; clear smooth boundary.

BA—7 to 18 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine to medium roots; common very fine to medium pores; slightly acid; clear smooth boundary.

Bw—18 to 28 inches; yellowish brown (10YR 5/4) silty clay loam, dark yellowish brown (10YR 3/4) moist; moderate medium prismatic structure; hard, firm, sticky and plastic; few very fine and fine roots; many very fine and fine pores; slightly acid; gradual smooth boundary.

C—28 to 60 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; massive; hard, firm, sticky and slightly plastic; few very fine and fine roots; many very fine and fine roots; 20 percent gravel; slightly acid.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 20 inches
Flooding: Occasional, late winter and spring
Content of rock fragments in the particle-size control section: 0 to 15 percent

Ap and BA horizons:
- Value—4 or 5 dry, 2 or 3 moist
- Chroma—1 or 2 dry or moist
- Texture—loam or silt loam
- Content of organic matter—1 to 3 percent

Bw horizon:
- Value—5 or 6 dry, 3 or 4 moist
- Chroma—3 or 4 dry or moist
- Texture—loam, silt loam, or silty clay loam

C horizon:
- Value—6 or 7 dry, 4 or 5 moist
- Chroma—3 or 4 dry or moist
- Texture—gravelly loam or silt loam; some pedons have thin discontinuous strata of sand.
- Content of gravel—10 to 25 percent

Myerscreek Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Moraines, backslopes, footslopes, and toeslopes
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 3 to 65 percent
Elevation: 3,400 to 6,800 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 35 to 42 degrees F
Frost-free period: 60 to 90 days
Taxonomic classification: Loamy-skeletal, isotic Andic Eutrocryepts

Typical Pedon

Myerscreek ashy fine sandy loam, in an area of Myerscreek-Manley complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 1.5 miles north of Mount Bonaparte; 600 feet west and 400 feet north of the southeast corner of sec. 1, T. 38 N., R. 29 E.; latitude 48 degrees 48 minutes 50 seconds north and longitude 119 degrees 6 minutes 2 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.
C—0 to 1 inch; white (10YR 8/1) ashy silt loam, grayish brown (10YR 5/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine roots; common very fine and fine pores; 5 percent gravel; moderately acid; clear wavy boundary.
2A—1 to 4 inches; pale brown (10YR 6/3) ashy fine sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine and common medium and coarse roots; common very fine and fine pores; 5 percent gravel; moderately acid; clear smooth boundary.
2Bw—4 to 12 inches; light yellowish brown (10YR 6/4) ashy fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium and coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine and few medium and coarse roots; common very fine and fine pores; 5 percent gravel; slightly acid; clear smooth boundary.
3CB—12 to 31 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, grayish brown (10YR 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine and few medium roots; common very fine and fine pores; 35 percent gravel and 5 percent cobbles; slightly acid; gradual wavy boundary.
3Cd1—31 to 46 inches; light gray (2.5Y 7/2) very gravelly sandy loam, grayish brown (2.5Y 5/2) moist; massive; hard, friable, nonsticky and nonplastic; few very fine roots; few fine pores; 35 percent gravel and 5 percent cobbles; slightly acid; gradual wavy boundary.
3Cd2—46 to 60 inches; light brownish gray (2.5Y 6/2) very gravelly sandy loam, grayish brown (2.5Y 5/2) moist; massive; hard, firm, slightly sticky and slightly plastic; common thin olive brown (2.5Y 4/3, moist) stains; 30 percent gravel and 5 percent cobbles; slightly acid.

Range in Characteristics

Depth to densic material: 20 to 35 inches
Depth to till: 7 to 14 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches

Content of rock fragments in the particle-size control section: 35 to 60 percent
Note: Not all pedons have a C horizon.
Soil moisture regime: Xeric

C horizon (where present):
Value—7 or 8 dry, 5 or 6 moist
Chroma—1 or 2 dry or moist
Texture—ashy silt loam, ashy fine sandy loam, stony ashy silt loam, or stony ashy fine sandy loam
Content of gravel—0 to 20 percent
Content of cobbles—0 to 10 percent
Content of stones—0 to 15 percent

2A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Texture—ashy fine sandy loam, ashy silt loam, or stony ashy fine sandy loam
Content of gravel—0 to 15 percent
Content of cobbles—0 to 5 percent
Content of stones—0 to 15 percent

2Bw horizon:
Value—5 or 6 dry
Chroma—4 to 6 dry or moist
Texture—ashy fine sandy loam, gravelly ashy fine sandy loam, gravelly ashy sandy loam, stony ashy sandy loam, or stony ashy fine sandy loam
Content of gravel—5 to 20 percent
Content of cobbles—0 to 5 percent
Content of stones—0 to 15 percent

3CB horizon:
Hue—2.5Y or 10YR
Value—6 or 7 dry
Chroma—2 or 3 dry or moist
Texture—very gravelly, very cobbly, or very stony sandy loam
Content of gravel—25 to 40 percent
Content of cobbles—0 to 25 percent
Content of stones—0 to 20 percent

3Cd horizon:
Hue—2.5Y or 5Y
Value—6 or 7 dry
Chroma—2 or 3 dry or moist
Texture—very gravelly, very cobbly, or very stony sandy loam
Content of gravel—25 to 40 percent
Content of cobbles—0 to 25 percent
Content of stones—0 to 20 percent

Nahahum Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and footslopes, generally on southerly aspects
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial till from metasedimentary rock
Slope: 15 to 65 percent

Elevation: 3,100 to 4,800 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 45 degrees F
Frost-free period: 85 to 120 days
Taxonomic classification: Fine-loamy, isotic, frigid Vitrandic Haploxeralfs

Typical Pedon

Nahahum ashy loam, in an area of Nahahum-Coxit complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 6.5 miles north of Conconully, Washington; 1,200 feet east and 1,600 feet south of the northwest corner of sec. 3, T. 36 N., R. 24 E.; latitude 48 degrees 39 minutes 0 seconds north and longitude 119 degrees 48 minutes 51 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.
A—0 to 3 inches; grayish brown (10YR 5/2) ashy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; few fine tubular pores; slightly acid; clear smooth boundary.
Bw—3 to 12 inches; pale brown (10YR 6/3) ashy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; few fine tubular pores; 5 percent gravel; neutral; clear wavy boundary.
2Bt1—12 to 20 inches; brown (10YR 5/3) gravelly clay loam, brown (10YR 4/3) moist; strong fine and medium angular blocky structure; very hard, firm, moderately sticky and moderately plastic; common very fine and fine and few medium roots; common fine pores; common distinct clay films on faces of peds; 15 percent gravel; neutral; clear wavy boundary.
2Bt2—20 to 34 inches; pale brown (10YR 6/3) gravelly clay loam, brown (10YR 5/3) moist; strong medium angular blocky structure; very hard, firm, moderately sticky and moderately plastic; common very fine and fine roots; common fine pores; many distinct clay films on faces of peds; 15 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
2Bt3—34 to 44 inches; light yellowish brown (10YR 6/4) gravelly clay loam, brown (10YR 5/3) moist; strong medium angular blocky structure; very hard, firm, moderately sticky and moderately plastic; few very fine and fine roots; common fine pores; many distinct clay films on faces of peds; 20 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
2BC—44 to 60 inches; light yellowish brown (10YR 6/4) gravelly loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few very fine roots; few fine pores; 20 percent gravel and 5 percent cobbles; neutral.

Range in Characteristics

Depth to glacial till: 7 to 14 inches
Thickness of the material influenced by mixed volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 15 to 30 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist

Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 to 4 dry or moist
Content of gravel—0 to 15 percent

2Bt horizon:
Value—5 or 6 dry, 3 to 5 moist
Chroma—3 or 4 dry or moist
Texture—gravelly clay loam or gravelly sandy clay loam
Content of gravel—15 to 25 percent
Content of cobbles—0 to 10 percent

2BC horizon:
Value—5 to 7 dry, 3 to 5 moist
Chroma—3 or 4 dry or moist
Texture—gravelly loam, gravelly sandy clay loam, or gravelly clay loam
Content of gravel—15 to 25 percent
Content of cobbles—0 to 5 percent

Nanamkin Series

Soil depth: Very deep
Drainage class: Somewhat excessively drained
Landscape: Mountains
Position on landscape: Outwash terraces
Parent material: Glacial outwash
Slope: 0 to 15 percent
Elevation: 2,500 to 3,500 feet
Mean annual precipitation: 20 to 25 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Sandy-skeletal, isotic, frigid Typic Xerorthents

Typical Pedon

Nanamkin gravelly sandy loam; North Ferry Area, Washington; 15 yards north and 150 yards west of the junction of Inchelium Road and the South Fork of O'Brien Creek; $NW^1/_4SW^1/_4$ sec. 32, T. 36 N., R. 34 E.; latitude 48 degrees 34 minutes 30 seconds north and longitude 118 degrees 35 minutes 2 seconds west.

Oi—1 inch to 0; slightly decomposed mat of leaves, twigs, and needles.
A—0 to 5 inches; light gray (10YR 7/2) gravelly sandy loam, dark grayish brown (10YR 4/2) moist; very weak coarse granular structure; soft, very friable, nonsticky and nonplastic; many fine roots; 25 percent gravel and 2 percent cobbles; strongly acid; clear smooth boundary.
Bw1—5 to 12 inches; very pale brown (10YR 7/4) very gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; massive; slightly compact, slightly hard, friable, nonsticky and nonplastic; many fine roots; 45 percent gravel and 10 percent cobbles; moderately acid; clear wavy boundary.
Bw2—12 to 21 inches; very pale brown (10YR 7/3) very gravelly loamy coarse sand, dark brown (10YR 4/3) moist; single grain; loose; 45 percent gravel and 10 percent cobbles; slightly acid; abrupt smooth boundary.
C1—21 to 29 inches; white (10YR 8/2) very gravelly loamy coarse sand, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; 40 percent gravel and 10 percent cobbles; slightly acid; clear irregular boundary.
2C2—29 to 37 inches; light gray (10YR 7/2) extremely gravelly loamy sand, pale brown (10YR 6/3) moist; massive; slightly compact; 50 percent gravel, 10 percent stones, and 10 percent cobbles; slightly acid; abrupt wavy boundary.
3C3—37 to 39 inches; white (10YR 8/2) extremely paragravelly sand, very pale brown (10YR 8/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; mat of roots in horizon; moderately acid; abrupt wavy boundary.

4Bwb—39 to 46 inches; very pale brown (10YR 7/4) gravelly loamy coarse sand, yellowish brown (10YR 5/4) moist; massive; slightly hard, firm, slightly sticky and nonplastic; many fine roots; several brown stains and textural bands; 20 percent gravel, 5 percent stones, and 5 percent cobbles; moderately acid; clear wavy boundary.

5C—46 to 60 inches; extremely stony sand; slightly compact; 35 percent gravel, 15 percent stones, and 20 percent cobbles.

Range in Characteristics

Content of coarse fragments in the particle-size control section: More than 50 percent

A horizon:
Value—6 to 8 dry

Bw horizon:
Hue—10YR or 7.5YR
Value—6 or 7 dry
Chroma—3 or 4 dry
Texture—loamy sand or loamy coarse sand; very gravelly or extremely gravelly

C1 and C2 horizons:
Value—7 or 8 dry
Texture—loamy sand or loamy coarse sand; very gravelly, extremely gravelly, or very cobbly

4Bwb horizon:
Hue—10YR or 7.5YR
Value—6 or 7 dry
Chroma—3 or 4 dry
Texture—loamy sand or loamy coarse sand; gravelly, extremely extremely gravelly, or very cobble

5C horizon:
Texture—sand or coarse sand; extremely stony or very stony
Total content of rock fragments—50 to 80 percent

Nevine Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains and moraines
Position on landscape: Footslopes and backslopes
Parent material: Volcanic ash (14 to 28 inches) over glacial till
Slope: 3 to 65 percent
Elevation: 2,000 to 5,500 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 39 to 46 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Ashy over loamy-skeletal, glassy over isotic, frigid Typic Vitrixerands

Typical Pedon

Nevine ashy fine sandy loam, in an area of Nevine-Louploup complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 1 mile north of Cayuse Mountain; 2,400 feet west and 1,500 feet north of the southeast corner of sec. 9, T. 37 N., R. 29 E.; latitude 48 degrees 42 minutes 59 seconds north and longitude 119 degrees 10 minutes 29 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, twigs, and grass.
A—0 to 3 inches; light brownish gray (10YR 6/2) ashy fine sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine and few medium roots; few fine pores; 5 percent gravel; neutral; clear smooth boundary.
Bw1—3 to 8 inches; pale brown (10YR 6/3) ashy fine sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine and few medium roots; few fine pores; 5 percent gravel; neutral; clear wavy boundary.
Bw2—8 to 20 inches; light yellowish brown (10YR 6/4) gravelly ashy fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine and few medium roots; common fine pores; 15 percent gravel and 5 percent cobbles; neutral; abrupt wavy boundary.
2CB—20 to 37 inches; light gray (2.5Y 7/2) very gravelly sandy loam, light olive brown (2.5Y 5/3) moist; massive; hard, very friable, nonsticky and nonplastic; common very fine roots; few fine pores; few fine distinct dark yellowish brown (10YR 4/4, moist) stains; 30 percent gravel, 10 percent cobbles, and 5 percent stones; neutral; gradual wavy boundary.
2Cd1—37 to 50 inches; pale yellow (2.5Y 7/3) very gravelly sandy loam, light olive brown (2.5Y 5/3) moist; massive; hard, friable, slightly sticky and nonplastic; few very fine roots; common fine pores; common fine and medium dark brown (10YR 4/3, moist) stains; 30 percent gravel, 10 percent cobbles, and 5 percent stones; neutral; gradual wavy boundary.
2Cd2—50 to 60 inches; light gray (2.5Y 7/2) very gravelly sandy loam, grayish brown (2.5Y 5/2) moist; massive; hard, friable, slightly sticky and nonplastic; few prominent yellowish brown (10YR 4/3, moist) bands 1 to 5 millimeters in width; 35 percent gravel and 10 percent cobbles; neutral.

Range in Characteristics

Depth to densic material: 20 to 40 inches
Depth to till: 14 to 28 inches
Thickness of the material influenced by volcanic ash: 14 to 28 inches
Rock fragments: 0 to 20 percent in the ashy surface layer and 35 to 65 percent semirounded granitic fragments in the glacial till
Note: Some pedons have a thin C horizon directly below the organic layer. The C horizon consists of a 140 to 190 year old “T” or 450 to 500 year old “W” ash from Mount Saint Helens.

A horizon:
Value—5 to 7 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—ashy fine sandy loam or ashy silt loam
Content of gravel—0 to 10 percent
Content of cobbles—0 to 5 percent

Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Texture—ashy fine sandy loam or gravelly ashy fine sandy loam
Content of gravel—0 to 15 percent
Content of cobbles—0 to 5 percent

2CB horizon:
Hue—2.5Y or 10YR
Value—6 or 7 dry, 4 to 6 moist

Chroma—2 to 4 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—20 to 40 percent
Content of cobbles—5 to 15 percent
Content of stones—0 to 10 percent

2Cd horizon:
Hue—2.5Y or 10YR,
Value—6 or 7 dry, 4 to 6 moist
Chroma—2 to 4 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—20 to 40 percent
Content of cobbles—5 to 25 percent
Content of stones—0 to 15 percent

Newbon Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains and foothills
Position on landscape: Footslopes and backslopes
Parent material: Glacial till
Slope: 0 to 65 percent
Elevation: 1,800 to 3,000 feet
Mean annual precipitation: 11 to 15 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 130 to 150 days
Taxonomic classification: Coarse-loamy, mixed, superactive, mesic Typic Haploxerolls

Typical Pedon

Newbon gravelly loam; Okanogan County Area, Washington; 900 feet east and 475 feet north of the southwest corner of sec. 20, T. 33 N., R. 22 E.; latitude 48 degrees 20 minutes 24 seconds north and longitude 120 degrees 6 minutes 22 seconds west.

A1—0 to 2 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; many roots; 20 percent gravel; neutral; abrupt smooth boundary.
A2—2 to 13 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark brown (10YR 2/2) moist; weak coarse granular structure; slightly hard, very friable, slightly sticky and nonplastic; many roots; few fine pores; 20 percent gravel; neutral; clear wavy boundary.
Bw—13 to 25 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few roots; common very fine pores; 30 percent gravel; neutral; clear smooth boundary.
C—25 to 60 inches; light brownish gray (10YR 6/2) very gravelly loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few roots; few fine pores; 40 percent gravel; neutral.

Range in Characteristics

Content of rock fragments in the particle-size control section: 15 to 35 percent
Thickness of the mollic epipedon: 10 to 18 inches

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Texture—very gravelly loam, stony loam, or gravelly loam

Content of gravel—5 to 50 percent
Content of stones—0 to 15 percent

Bw horizon:
Hue—7.5YR or 10YR
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist.
Texture—gravelly loam or gravelly silt loam
Content of gravel—15 to 35 percent

C horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 to 4 moist or dry
Texture—very gravelly loam or gravelly silt loam
Content of gravel—15 to 40 percent

Newhorn Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and footslopes
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 15 to 35 percent
Elevation: 3,300 to 4,800 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 115 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Andic Haploxerepts

Typical Pedon

Newhorn ashy fine sandy loam, in an area of Newhorn ashy fine sandy loam, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 7 miles west-northwest of Conconully, Washington; about 2,200 feet west and 1,300 feet north of the southeast corner of sec. 30, T. 36 N., R. 24 E.; latitude 48 degrees 35 minutes 12 seconds north and longitude 119 degrees 52 minutes 20 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.
A—0 to 4 inches; brown (10YR 5/3) ashy fine sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common very fine and fine pores; 5 percent gravel; neutral; clear smooth boundary.
Bw—4 to 13 inches; light yellowish brown (10YR 6/4) ashy fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; moderately smeary; many very fine and fine and few medium and coarse roots; common very fine and fine pores; 5 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
2CB—13 to 28 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, grayish brown (10YR 5/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common very fine and fine pores; 30 percent gravel and 5 percent cobbles; neutral; gradual wavy boundary.
2C—28 to 36 inches; very pale brown (10YR 7/3) very gravelly sandy loam, brown (10YR 5/3) moist; massive; hard, friable, nonsticky and slightly plastic; few very

fine roots; common very fine and fine pores; 35 percent gravel and 10 percent cobbles; neutral; gradual wavy boundary.
2Cd—36 to 60 inches; very pale brown (10YR 7/3) very gravelly sandy loam, brown (10YR 5/3) moist; massive; very hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine and fine pores; 35 percent gravel and 5 percent cobbles; neutral.

Range in Characteristics

Depth to densic material: 20 to 40 inches
Depth to till: 7 to 14 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 50 percent
Note: Some pedons have a white horizon directly below the organic layer. The horizon consists of 140 to 190 year old “T” or 450 to 500 year old “W” ash from Mount Saint Helens.

A horizon:
Value—3 or 4 moist
Chroma—2 or 3 dry or moist
Content of gravel—0 to 10 percent

Bw horizon:
Chroma—3 or 4 dry or moist
Texture—ashy fine sandy loam or gravelly ashy fine sandy loam
Content of gravel—5 to 15 percent
Content of cobbles—0 to 5 percent

2CB horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 to 4 dry or moist
Texture—very gravelly sandy loam or very gravelly fine sandy loam
Content of gravel—25 to 40 percent
Content of cobbles—0 to 10 percent

2C horizon:
Hue—2.5Y or 10YR
Value—6 or 7 dry, 5 or 6 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—20 to 40 percent
Content of cobbles—5 to 15 percent

2Cd horizon:
Hue—2.5Y or 10YR
Value—6 or 7 dry, 5 or 6 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—25 to 45 percent
Content of cobbles—5 to 15 percent

Nicmar Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Lower backslopes and footslopes of mountains

Parent material: Mixed volcanic ash (10 to 25 inches) over glacial till from volcanic rock and sedimentary
Slope: 15 to 65 percent
Elevation: 2,500 to 4,420 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 40 to 45 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Palexeralfs

Typical Pedon

Nicmar ashy loam, in an area of Nicmar ashy loam, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 500 feet south and 200 feet east of the northwest corner of sec. 10, T. 39 N., R. 31 E.; latitude 48 degrees 53 minutes 55 seconds north and longitude 118 degrees 54 minutes 4 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, twigs, and leaves; clear smooth boundary.
A—0 to 4 inches; light brownish gray (10YR 6/2) ashy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; many fine irregular pores; 5 percent gravel; neutral; clear smooth boundary.
Bw—4 to 16 inches; light brownish gray (10YR 6/2) gravelly ashy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine irregular pores; 15 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
2Bt1—16 to 23 inches; olive (5Y 5/3) very cobbly clay loam, olive (5Y 4/3) moist; strong medium angular blocky structure; very hard, firm, very sticky and very plastic; common very fine roots; few very fine irregular pores; few faint discontinuous clay films on faces of peds; 15 percent gravel, 25 percent cobbles, and 5 percent stones; neutral; clear wavy boundary.
2Bt2—23 to 33 inches; olive gray (5Y 5/2) very cobbly clay loam, olive gray (5Y 4/2) moist; strong medium angular blocky structure; very hard, firm, very sticky and very plastic; few very fine roots; few very fine irregular pores; few faint discontinuous clay films on faces of peds; 15 percent gravel, 30 percent cobbles, and 5 percent stones; neutral; gradual wavy boundary.
2BC—33 to 60 inches; light olive gray (5Y 6/2) very gravelly sandy clay loam, olive gray (5Y 5/2) moist; massive; hard, friable, moderately sticky and moderately plastic; few very fine roots; few very fine irregular pores; 25 percent gravel, 10 percent cobbles, and 5 percent stones; neutral.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 10 to 25 inches
Content of rock fragments in the particle-size control section: 35 to 55 percent

A horizon:
Value—5 or 6 dry, 3 to 5 moist
Chroma—2 or 3 dry or moist
Texture—ashy loam or gravelly ashy loam
Content of gravel—0 to 30 percent

Bw horizon:
Value—5 or 6 dry, 3 to 5 moist
Chroma—2 to 4 dry or moist
Texture—ashy loam or gravelly ashy loam

Content of gravel—0 to 20 percent
Content of cobbles—0 to 10 percent

2Bt horizon:
Hue—5Y, 2.5Y, or 10YR
Value—4 to 7 dry, 3 to 6 moist
Chroma—2 to 4 dry or moist
Texture—very cobbly clay loam or very cobbly sandy clay loam
Content of gravel—10 to 30 percent
Content of cobbles—15 to 40 percent
Content of stones—0 to 10 percent

2BC horizon:
Hue—5Y, 2.5Y, 10YR, or 7.5YR
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly or gravelly sandy clay loam or very gravelly or gravelly clay loam
Content of gravel—15 to 45 percent
Content of cobbles—0 to 15 percent
Content of stones—0 to 10 percent

Ontrail Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes
Parent material: Mixed volcanic ash (10 to 20 inches) over colluvium from sedimentary and volcanic rock sources of the Ventura Member of the Midnight Peak Formation
Slope: 35 to 65 percent
Elevation: 2,200 to 3,800 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts

Typical Pedon

Ontrail gravelly ashy sandy loam, in an area of Redpeak-Ontrail complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 1.5 miles southeast of Mazama, Washington; 2,100 feet west and 2,700 feet south of the northeast corner of sec. 36, T. 36 N., R. 19 E.; latitude 48 degrees 34 minutes 38 seconds north and longitude 120 degrees 24 minutes 38 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.
A—0 to 4 inches; dark brown (7.5YR 4/2) gravelly ashy sandy loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; common very fine and fine irregular pores; 15 percent gravel; neutral; clear smooth boundary.
Bw—4 to 16 inches; brown (7.5YR 5/3) gravelly ashy sandy loam, dark brown (7.5YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common very fine and fine irregular pores; 20 percent gravel; slightly acid; clear wavy boundary.

2C1—16 to 32 inches; reddish brown (5YR 5/3) very gravelly sandy loam, reddish brown (5YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; few fine irregular pores; 35 percent gravel and 5 percent cobbles; slightly acid; gradual wavy boundary.
2C2—32 to 60 inches; reddish brown (5YR 5/3) very gravelly sandy loam, reddish brown (5YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; few fine irregular pores; 45 percent gravel and 5 percent cobbles; slightly acid.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 16 to 20 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent

A horizon:
Hue—5YR or 7.5YR
Chroma—2 or 3 dry

Bw horizon:
Hue—5YR or 7.5YR
Value—5 or 6 dry
Chroma—2 or 3 dry or moist
Texture—gravelly or very gravelly ashy sandy loam
Content of gravel—15 to 35 percent

2C horizon:
Value—3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—30 to 45 percent
Content of cobbles—5 to 20 percent

Ortellcreek Series

Soil depth: Moderately deep or deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and footslopes
Parent material: Volcanic ash (7 to 14 inches) over glacial till from sedimentary and some volcanic rock
Slope: 15 to 65 percent
Elevation: 4,200 to 5,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Loamy-skeletal, isotic Andic Glossocryalfs

Typical Pedon

Ortellcreek gravelly ashy sandy loam, in an area of Ortellcreek gravelly ashy sandy loam, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 14 miles north of Winthrop, Washington; 1,100 feet east and 250 feet south of the northwest corner of sec. 24, T. 37 N., R. 20 E.; latitude 48 degrees 40 minutes 59 seconds north and longitude 120 degrees 17 minutes 11 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.

A—0 to 5 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, dark brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and few medium and coarse roots; common fine tubular pores; 15 percent gravel; slightly acid; clear smooth boundary.

Bw—5 to 13 inches; light yellowish brown (10YR 6/4) gravelly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; moderately smeary; many very fine and fine and few medium and coarse roots; common fine tubular pores; 15 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.

2E/Bt—13 to 19 inches; E part (60 percent) light gray (10YR 7/2) gravelly sandy loam, grayish brown (10YR 5/2) moist; Bt part (40 percent) grayish brown (10YR 5/2) gravelly sandy clay loam, dark grayish brown (10YR 4/2) moist; texture, if the soil is mixed, is gravelly sandy loam; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and moderately plastic; common very fine and fine and few medium and coarse roots; common fine and very fine irregular pores; few discontinuous faint clay films on faces of peds; 20 percent gravel; slightly acid; clear wavy boundary.

2Bt—19 to 35 inches; grayish brown (10YR 5/2) very gravelly sandy clay loam, dark grayish brown (10YR 4/2) moist; moderate medium angular blocky structure; hard, friable, moderately sticky and moderately plastic; common very fine and fine roots; common fine and very fine irregular pores; few discontinuous faint clay films on faces of peds; 25 percent gravel, 5 percent cobbles, and 10 percent stones; slightly acid; gradual wavy boundary.

3Btd—35 to 60 inches; grayish brown (10YR 5/2) very gravelly clay loam, dark grayish brown (10YR 4/2) moist; moderate medium angular blocky structure; very hard, firm, moderately sticky and moderately plastic; few very fine roots; few fine irregular pores; few discontinuous faint clay films on faces of peds; 30 percent gravel, 5 percent cobbles, and 10 percent stones; slightly acid.

Range in Characteristics

Depth to densic material: 35 to 45 inches
Depth to the 2Bt horizon: 15 to 24 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent

A horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Content of gravel—15 to 20 percent

Bw horizon:
Chroma—3 or 4 dry or moist
Texture—gravelly ashy sandy loam or ashy sandy loam
Content of gravel—10 to 20 percent
Content of cobbles—0 to 5 percent

2E/Bt horizon:
Value (E part)—6 or 7 dry, 5 or 6 moist
Chroma (E part)—2 or 3 dry or moist
Value (Bt part)—5 or 6 dry, 4 or 5 moist
Chroma (Bt part)—2 or 3 dry or moist
Texture—gravelly sandy loam or gravelly sandy clay loam
Content of gravel—15 to 25 percent
Content of cobbles—0 to 5 percent

2Bt horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly clay loam or very gravelly sandy clay loam
Content of gravel—25 to 35 percent
Content of cobbles—0 to 10 percent
Content of stones—0 to 10 percent

3Btd horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly clay loam or very gravelly sandy clay loam
Content of gravel—25 to 40 percent
Content of cobbles—0 to 10 percent
Content of stones—0 to 10 percent

Oxerine Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and shoulders
Parent material: Volcanic ash (7 to 14 inches) over residuum and colluvium from metasedimentary and andesite rock
Slope: 30 to 65 percent
Elevation: 2,400 to 6,500 feet
Mean annual precipitation: 18 to 30 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Andic Haploxerepts

Typical Pedon

Oxerine gravelly ashy fine sandy loam, in an area of Oxerine-Nevine complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 6 miles east of Chesaw, Washington; 1,800 feet west and 2,100 feet north of the southeast corner of sec. 21, T. 40 N., R. 31 E.; latitude 48 degrees 57 minutes 10 seconds north and longitude 118 degrees 54 minutes 30 seconds west.

Oi—1 inch to 0; slightly decomposed mat of needles, twigs, leaves, and grass; abrupt smooth boundary.
A—0 to 4 inches; yellowish brown (10YR 5/4) gravelly ashy fine sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common fine tubular pores; 15 percent gravel; neutral; clear wavy boundary.
Bw—4 to 10 inches; light yellowish brown (10YR 6/4) gravelly ashy fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common fine tubular pores; 20 percent gravel; slightly acid; clear wavy boundary.
2C1—10 to 19 inches; light yellowish brown (10YR 6/4) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and very fine roots; common fine tubular pores; 30 percent gravel, 15 percent cobbles, and 2 percent stones; slightly acid; gradual wavy boundary.
2C2—19 to 31 inches; pale brown (10YR 6/3) extremely cobbly sandy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic;

common very fine and fine roots in the upper part; few pores; 30 percent gravel, 35 percent cobbles, and 10 percent stones; slightly acid; abrupt wavy boundary.
2R—31 inches; andesite.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 70 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Texture—ashy fine sandy loam or gravelly ashy fine sandy loam
Content of gravel—0 to 20 percent
Content of cobbles—0 to 5 percent

Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Texture—ashy fine sandy loam or gravelly ashy fine sandy loam
Content of gravel—0 to 25 percent
Content of cobbles—0 to 5 percent

2C1 horizon:
Value—6 or 7 dry, 3 or 4 moist
Chroma—2 to 4 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—25 to 40 percent
Content of cobbles—10 to 20 percent
Content of stones—0 to 5 percent

2C2 horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 to 4 dry or moist
Texture—extremely gravelly, very gravelly, extremely cobbly, or extremely flaggy sandy loam
Content of gravel—30 to 50 percent
Content of cobbles—10 to 35 percent
Content of flagstones—0 to 30 percent
Content of stones—0 to 10 percent

Parmenter Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Outwash terraces and terrace escarpments
Parent material: Volcanic ash (14 to 25 inches) over glacial outwash
Slope: 0 to 35 percent
Elevation: 3,600 to 5,100 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 39 to 43 degrees F
Frost-free period: 90 to 115 days
Taxonomic classification: Ashy over sandy or sandy-skeletal, glassy over isotic, frigid Typic Vitrixerands

Typical Pedon

Parmenter ashy fine sandy loam, in an area of Goddard-Parmenter complex, 0 to 15 percent; Okanogan National Forest Area, Washington; about 4 miles east of Wauconda, Washington; 1,600 feet west and 2,100 feet north of the southeast corner of sec. 1, T. 37 N., R. 29 E.; latitude 48 degrees 43 minutes 55 seconds north and longitude 119 degrees 6 minutes 21 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, twigs, and grass.

A—0 to 3 inches; pale brown (10YR 6/3) ashy fine sandy loam, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and few medium and coarse roots; few fine pores; 5 percent gravel; neutral; clear smooth boundary.

Bw1—3 to 12 inches; light yellowish brown (10YR 6/4) ashy fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very and fine and few medium and coarse roots; few fine pores; 5 percent gravel; slightly acid; gradual smooth boundary.

Bw2—12 to 22 inches; light yellowish brown (10YR 6/4) ashy fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine and few medium and coarse roots; few fine pores; 10 percent gravel; neutral; gradual smooth boundary.

2C1—22 to 34 inches; light yellowish brown (2.5Y 6/3) very gravelly loamy coarse sand, light olive brown (2.5Y 5/3) moist; single grain; loose; few very fine, fine, and medium roots; common fine irregular pores; 30 percent gravel and 10 percent cobbles; neutral; gradual wavy boundary.

2C2—34 to 60 inches; light yellowish brown (2.5Y 6/3) very gravelly loamy coarse sand, light olive brown (2.5Y 5/3) moist; single grain; loose; common fine irregular pores; 30 percent gravel, 15 percent cobbles, and 5 percent stones; neutral.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 14 to 25 inches

Depth to strongly contrasting textural stratification (2C horizon): 14 to 25 inches

Rock fragments: 0 to 20 percent in the ash layer and 50 to 80 percent semirounded rock fragments in the glacial outwash

Note: Some pedons have a thin E horizon directly below the organic layer. The E horizon consists of 140 to 190 year old “T” or 450 to 500 year old “W” ash from Mount Saint Helens.

A horizon:

Content of gravel—0 to 10 percent

Bw horizon:

Texture—ashy fine sandy loam or gravelly ashy fine sandy loam
Content of gravel—5 to 20 percent
Content of cobbles—0 to 5 percent

2C horizon:

Hue—10YR or 2.5Y
Value—4 or 5 moist
Texture—very gravelly loamy sand or very gravelly loamy coarse sand
Content of gravel—20 to 50 percent
Content of cobbles—10 to 20 percent
Content of stones—0 to 5 percent

Pebcreek Series

Soil depth: Moderately deep or deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and footslopes
Parent material: Mixed volcanic ash (10 to 14 inches) over glacial till
Slope: 15 to 65 percent
Elevation: 2,500 to 5,500 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 39 to 44 degrees F
Frost-free period: 85 to 125 days
Taxonomic classification: Sandy-skeletal, isotic, frigid, Vitrandic Haploxerepts

Typical Pedon

Pebcreek ashy sandy loam, in an area of Pebcreek-Brevco complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 12 miles northeast of Winthrop, Washington; 1,500 feet east and 450 feet north of the southwest corner of sec. 5, T. 36 N., R. 22 E.; latitude 48 degrees 38 minutes 37 seconds north and longitude 120 degrees 6 minutes 51 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles and twigs; clear smooth boundary.
A—0 to 5 inches; pale brown (10YR 6/3) ashy sandy loam, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and few medium and coarse roots; common very fine and fine irregular pores; 10 percent gravel; slightly acid; clear wavy boundary.
Bw—5 to 11 inches; light yellowish brown (10YR 6/4) gravelly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and few medium and coarse roots; common very fine and fine irregular pores; 15 percent gravel; slightly acid; clear wavy boundary.
2C/B—11 to 37 inches; 70 percent very pale brown (10YR 7/3) and 30 percent light yellowish brown (10YR 6/4) very gravelly sand, 70 percent pale brown (10YR 6/3) and 30 percent dark yellowish brown (10YR 4/6) moist; single grain; loose, nonsticky and nonplastic; common very fine and fine roots; 40 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.
2C—37 to 42 inches; very pale brown (10YR 7/3) very gravelly loamy sand, pale brown (10YR 6/3) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; 45 percent gravel; slightly acid; clear wavy boundary.
2Cd—42 to 60 inches; light gray (10YR 7/2) very gravelly sandy loam, light brownish gray (10YR 6/2) moist; massive; very hard, friable, nonsticky and nonplastic; few very fine roots; few very fine irregular pores; 30 percent gravel and 5 percent cobbles; slightly acid.

Range in Characteristics

Depth to densic material: 30 to 45 inches
Depth to glacial till and thickness of the material influenced by mixed volcanic ash: 10 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 65 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—ashy sandy loam or stony ashy sandy loam
Content of gravel—5 to 15 percent

Content of cobbles—0 to 5 percent
Content of stones—0 to 15 percent

Bw horizon:
Value—3 or 4 moist
Chroma—2 to 4 dry or moist
Texture—gravelly ashy sandy loam, ashy sandy loam, or stony ashy sandy loam
Content of gravel—10 to 20 percent
Content of cobbles—0 to 5 percent
Content of stones—0 to 10 percent

2C/B horizon:
Value—6 or 7 dry, 5 or 6 moist
Chroma—3 or 4 dry or moist
Texture—very gravelly sand or very gravelly loamy sand
Content of gravel—35 to 45 percent
Content of cobbles—0 to 5 percent

2C horizon:
Value—6 or 7 dry, 5 or 6 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly loamy sand, very gravelly sand, or very gravelly loamy coarse sand
Content of gravel—30 to 45 percent
Content of cobbles—5 to 10 percent
Content of stones—0 to 5 percent

2Cd horizon:
Hue—2.5Y or 10YR
Value—6 or 7 dry, 5 or 6 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly loamy sand, very gravelly sandy loam, or gravelly sandy loam
Content of gravel—25 to 40 percent
Content of cobbles—0 to 10 percent
Content of stones—0 to 3 percent

Peka Series

Soil depth: Deep
Drainage class: Well drained
Landscape: Foothills and mountains
Position on landscape: Backslopes, footslopes, and toeslopes, generally on southerly aspects
Parent material: Mixed volcanic ash (10 to 18 inches) over glacial till
Slope: 15 to 65 percent
Elevation: 2,800 to 4,500 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 100 to 130 days
Taxonomic classification: Loamy-skeletal, mixed, superactive, mesic Vitrandic Haploxerolls

Typical Pedon

Peka stony ashy sandy loam, in an area of Peka-Donavan complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 5 miles west of

Wauconda, Washington; 1,400 feet east and 300 feet north of the southwest corner of sec. 11, T. 37 N., R. 29 E.; latitude 48 degrees 42 minutes 43 seconds north and longitude 119 degrees 8 minutes 12 seconds west.

Oi—1 inch to 0; slightly decomposed mat of needles, twigs, and grass; clear smooth boundary.

A1—0 to 6 inches; grayish brown (10YR 5/2) stony ashy sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine, common medium, and few coarse roots; common very fine and fine irregular pores; 10 percent gravel, 5 percent cobbles, and 5 percent stones; neutral; clear smooth boundary.

A2—6 to 15 inches; brown (10YR 5/3) gravelly ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; common very fine irregular pores; 10 percent gravel and 5 percent cobbles; neutral; clear smooth boundary.

2Bw—15 to 24 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine irregular pores; 25 percent gravel, 20 percent cobbles, and 5 percent stones; neutral; clear wavy boundary.

2C—24 to 49 inches; pale brown (10YR 7/3) very cobbly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; few fine irregular pores; 35 percent gravel, 20 percent cobbles, and 5 percent stones; slightly acid; clear smooth boundary.

2Cd—49 to 60 inches; very pale brown (10YR 7/3) very gravelly sandy loam, brown (10YR 5/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; common fine and few medium roots in the upper part; few very fine irregular pores; 35 percent gravel and 10 percent cobbles; neutral.

Range in Characteristics

Depth to densic material: 40 to 60 inches
Thickness of the material influenced by mixed volcanic ash: 10 to 18 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent
Thickness of the mollic epipedon: 10 to 18 inches

A1 horizon:
- Value—4 or 5 dry, 3 or 4 moist
- Chroma—2 or 3 dry or moist
- Texture—ashy sandy loam or stony ashy sandy loam
- Content of gravel—5 to 20 percent
- Content of cobbles—0 to 5 percent
- Content of stones—0 to 10 percent

2Bw horizon:
- Value—5 or 6 dry, 4 or 5 moist
- Chroma—3 or 4 dry or moist
- Texture—very cobbly or very gravelly sandy loam
- Content of gravel—20 to 35 percent
- Content of cobbles—5 to 20 percent
- Content of stones—0 to 5 percent

2C horizon:
- Value—5 to 7 dry, 4 to 5 moist
- Chroma—2 to 4 dry or moist
- Texture—very cobbly or very gravelly sandy loam

Content of gravel—25 to 50 percent
Content of cobbles—5 to 30 percent
Content of stones—0 to 10 percent

2Cd horizon:
Value—5 to 7 dry, 4 to 6 moist
Chroma—2 to 4 dry or moist
Content of gravel—30 to 45 percent
Content of cobbles—0 to 20 percent

Pelican Series

Soil depth: Moderately deep or deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, generally on southerly aspects
Parent material: Mixed volcanic ash (10 to 25 inches) over glacial till
Slope: 15 to 65 percent
Elevation: 3,900 to 5,300 feet
Mean annual precipitation: 18 to 22 inches
Mean annual air temperature: 39 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, mixed, superactive, frigid Vitrandic Haploxerolls

Typical Pedon

Pelican gravelly ashy loam, in an area of Coxit-Pelican complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 7.5 miles northwest of Conconully, Washington; about 400 feet north and 500 feet west of the southeast corner of sec. 33, T. 37 N., R. 24 E.; latitude 48 degrees 39 minutes 19 seconds north and longitude 119 degrees 49 minutes 17 seconds west.

A—0 to 11 inches; dark grayish brown (10YR 4/2) gravelly ashy loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; many fine and medium tubular roots; 10 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.

2Bw1—11 to 18 inches; yellowish brown (10YR 5/4) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; moderate fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many fine and medium tubular pores; 20 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.

2Bw2—18 to 28 inches; light yellowish brown (10YR 6/4) very gravelly sandy loam, yellowish brown (10YR 5/4) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; many very fine and fine roots; common fine and medium tubular roots; 35 percent gravel and 10 percent cobbles; neutral; gradual wavy boundary.

3C1—28 to 37 inches; light yellowish brown (2.5Y 6/4) very gravelly sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, slightly sticky and nonplastic; common very fine and fine roots; few fine irregular pores; 40 percent gravel and 10 percent cobbles; neutral; gradual wavy boundary.

3C2—37 to 46 inches; light yellowish brown (2.5Y 6/4) very gravelly sandy loam, light olive brown (2.5Y 5/4) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few very fine and fine roots; few fine irregular pores; common fine and

medium dark yellowish brown (10YR 4/6, moist) stains; 40 percent gravel and 5 percent cobbles; neutral; clear smooth boundary.

3Cd—46 to 60 inches; light olive brown (2.5Y 5/4) very gravelly sandy loam, olive brown (2.5Y 4/4) moist; massive; hard, firm, slightly sticky and nonplastic; very few fine irregular pores; 45 percent gravel and 5 percent cobbles with 10 percent paragravel and 10 percent paracobbles; slightly acid.

Range in Characteristics

Depth to densic material: 35 to 50 inches
Thickness of the material influenced by mixed volcanic ash: 10 to 25 inches
Content of rock fragments in the particle-size control section: 35 to 55 percent
Thickness of the mollic epipedon: 10 to 25 inches

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3 dry or moist
Content of gravel—5 to 15 percent
Content of cobbles—0 to 5 percent

2Bw1 horizon:
Value—5 or 6 dry, 3 to 5 moist
Chroma—3 or 4 dry or moist
Texture—gravelly or very gravelly sandy loam
Content of gravel—15 to 35 percent
Content of cobbles—0 to 10 percent

2Bw2 horizon:
Value—5 or 6 dry, 3 to 5 moist
Chroma—3 or 4 dry or moist
Content of gravel—30 to 45 percent
Content of cobbles—0 to 10 percent

3C horizon:
Chroma—4 to 6 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—35 to 45 percent
Content of cobbles—0 to 25 percent

3Cd horizon:
Chroma—4 to 6 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—35 to 45 percent
Content of cobbles—0 to 25 percent

Pepoon Series

Soil depth: Very shallow or shallow
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Ridges and sideslopes
Parent material: Volcanic ash (8 to 15 inches) over bedrock
Slope: 15 to 50 percent
Elevation: 2,500 to 6,500 feet
Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 110 days
Taxonomic classification: Ashy-skeletal, glassy, frigid Lithic Vitrixerands

Typical Pedon

Pepoon stony ashy loam; North Ferry Area, Washington; in a clearing north of Mattson Creek, along the Davis Lake logging road in the Colville National Forest; sec. 2, T. 37 N., R. 36 E.; latitude 48 degrees 43 minutes 47 seconds north and longitude 118 degrees 12 minutes 36 seconds west.

A1—0 to 5 inches; very dark gray (10YR 3/1) stony ashy loam, black (10YR 2/1) moist; single grain; loose, friable, nonsticky and nonplastic; many fine roots; 25 percent stones; slightly acid; clear wavy boundary.

A2—5 to 10 inches; very dark brown (10YR 2/2) extremely stony ashy loam, black (10YR 2/1) moist; single grain; loose, very friable, nonsticky and nonplastic; many fine roots; 60 percent stones; slightly alkaline; abrupt smooth boundary.

2R—10 inches; fractured quartzitic bedrock.

Range in Characteristics

Depth to bedrock and thickness of the mollic epipedon: 8 to 15 inches
Thickness of the material influenced by volcanic ash: 8 to 15 inches
Content of rock fragments in the particle-size control section: 35 to 50 percent

A horizon:

Value—1 to 4 dry, 2 or 3 moist
Chroma—1 or 2 dry or moist.
Texture—ashy loam or ashy silt loam; stony or extremely stony

Pettijohn Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes
Parent material: Volcanic ash (30 to 45 inches) over granitic colluvium
Slope: 35 to 65 percent
Elevation: 2,600 to 5,900 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 40 to 46 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Ashy-skeletal, glassy, frigid Typic Vitrixerands

Typical Pedon

Pettijohn stony ashy fine sandy loam, in an area of Pettijohn-Rock outcrop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 1 mile west of Bonaparte Lake; 1,300 feet north and 2,600 feet east of the southwest corner of sec. 8, T. 38 N., R. 30 E.; latitude 48 degrees 48 minutes 8 seconds north and longitude 119 degrees 3 minutes 59 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.

A—0 to 4 inches; pale brown (10YR 6/3) stony ashy fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium roots; many very fine and fine irregular pores; 5 percent gravel, 10 percent cobbles, and 5 percent stones; neutral; gradual wavy boundary.

Bw1—4 to 24 inches; pale brown (10YR 6/3) very cobbly ashy fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine,

common coarse, and few medium roots; many very fine and fine irregular pores; 10 percent gravel, 30 percent cobbles, and 10 percent stones; slightly acid; gradual wavy boundary.

Bw2—24 to 42 inches; very pale brown (10YR 7/4) very stony ashy fine sandy loam, dark yellowish brown (10YR 4/6) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine, fine, and coarse and few medium roots; many fine irregular pores; 15 percent gravel, 25 percent cobbles, and 15 percent stones; slightly acid; gradual wavy boundary.

2C—42 to 60 inches; light yellowish brown (2.5Y 6/3) very gravelly sandy loam, light olive brown (2.5Y 5/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine, fine, and medium roots; common fine irregular pores; 40 percent gravel, 5 percent cobbles, and 5 percent stones; slightly acid.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 30 to 45 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent

A horizon:
- Value—4 to 6 dry, 3 or 4 moist
- Chroma—3 or 4 dry or moist
- Content of gravel—5 to 10 percent
- Content of cobbles—5 to 15 percent
- Content of stones—5 to 10 percent

Bw horizon:
- Value—5 to 7 dry, 4 or 5 moist
- Chroma—3 to 6 dry or moist
- Texture—very cobbly or very stony ashy fine sandy loam
- Content of gravel—10 to 20 percent
- Content of cobbles—10 to 35 percent
- Content of stones—0 to 15 percent

2C horizon:
- Hue—2.5Y or 10YR
- Value—6 or 7 dry, 4 to 6 moist
- Chroma—3 or 4 dry or moist
- Texture—very gravelly or very cobbly sandy loam
- Content of gravel—20 to 40 percent
- Content of cobbles—5 to 20 percent
- Content of stones—2 to 10 percent

Radercreek Series

Soil depth: Deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, generally on northerly aspects
Parent material: Mixed volcanic ash (7 to 24 inches) over colluvium and residuum from sedimentary and volcanic rock
Slope: 35 to 65 percent
Elevation: 3,350 to 4,900 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts

Typical Pedon

Radercreek gravelly ashy sandy loam, in an area of Radercreek-Santop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 15 miles southwest of Twisp, Washington; about 1,700 feet west and 1,900 feet south of the northeast corner of sec. 18, T. 33 N., R. 21 E.; latitude 48 degrees 21 minutes 31 seconds north and longitude 120 degrees 15 minutes 50 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, twigs, and leaves; abrupt smooth boundary.

A—0 to 5 inches; brown (10YR 5/3) gravelly ashy sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; many fine tubular pores; 15 percent gravel; neutral; clear smooth boundary.

Bw1—5 to 12 inches; brown (10YR 5/3) gravelly ashy sandy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine irregular pores; 20 percent gravel; neutral; clear wavy boundary.

Bw2—12 to 17 inches; brown (10YR 5/3) very gravelly ashy sandy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; common fine irregular pores; 35 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.

2C1—17 to 24 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 5/3) moist; massive; soft, friable, nonsticky and nonplastic; common very fine and fine and few medium roots; few fine irregular pores; 30 percent gravel and 20 percent cobbles; slightly acid; gradual wavy boundary.

2C2—24 to 43 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 5/3) moist; massive; soft, friable, nonsticky and nonplastic; few very fine, fine, and medium roots; few fine irregular pores; 35 percent gravel and 20 percent cobbles; slightly acid.

2R—43 inches; sandstone.

Range in Characteristics

Depth to bedrock: 40 to 60 inches
Thickness of the material influenced by mixed volcanic ash: 7 to 24 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent

A horizon:
- Hue—10YR or 7.5YR
- Value—4 or 5 dry, 2 or 3 moist
- Chroma—2 or 3 dry or moist
- Content of gravel—15 to 25 percent

Bw horizon:
- Value—4 or 5 dry, 3 or 4 moist
- Chroma—2 or 3 dry or moist
- Texture—gravelly or very gravelly ashy sandy loam
- Content of gravel—15 to 35 percent
- Content of cobbles—0 to 15 percent

2C horizon:
- Value—4 to 6 dry, 3 to 5 moist
- Chroma—2 or 3 dry or moist
- Texture—very gravelly or very cobbly sandy loam
- Content of gravel—25 to 50 percent
- Content of cobbles—10 to 30 percent
- Content of stones—0 to 5 percent

Redpeak Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and shoulders
Parent material: Mixed volcanic ash (10 to 20 inches) over colluvium and residuum from sedimentary and volcanic rock sources of the Ventura Member of the Midnight Peak Formation
Slope: 35 to 65 percent
Elevation: 2,200 to 3,800 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts

Typical Pedon

Redpeak gravelly ashy sandy loam, in an area of Redpeak-Ontrail complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 1.5 miles southwest of Mazama, Washington; 1,500 feet west and 1,200 feet north of the southeast corner of sec. 36, T. 36 N., R. 19 E.; latitude 48 degrees 34 minutes 30 seconds north and longitude 120 degrees 24 minutes 27 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.
A—0 to 4 inches; reddish brown (5YR 4/3) gravelly ashy sandy loam, dark reddish brown (5YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common very fine and fine irregular pores; 15 percent gravel; slightly acid; clear wavy boundary.
Bw1—4 to 9 inches; reddish brown (2.5YR 5/3) gravelly ashy sandy loam, reddish brown (2.5YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine and very fine irregular pores; 20 percent gravel; slightly acid; clear wavy boundary.
Bw2—9 to 16 inches; reddish brown (2.5YR 5/3) very gravelly ashy sandy loam, reddish brown (2.5YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common fine and very fine irregular pores; 30 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
2C1—16 to 28 inches; reddish brown (2.5YR 4/3) very gravelly sandy loam, dark reddish brown (2.5YR 3/3) moist; massive; soft, very friable, slightly sticky and nonplastic; common very fine and fine roots; few fine irregular pores; 40 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
2C2—28 to 35 inches; reddish brown (2.5YR 4/3) very gravelly sandy loam, dark reddish brown (2.5YR 3/3) moist; massive; soft, very friable, slightly sticky and nonplastic; few very fine and fine roots; few fine irregular pores; 50 percent gravel and 5 percent cobbles; slightly acid.
2R—35 inches; red sandstone.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the material influenced by mixed volcanic ash: 10 to 20 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent

A horizon:
Hue—2.5YR or 5YR
Chroma—2 or 3 dry or moist

Bw horizon:
Hue—2.5YR or 5YR
Value—3 or 4 moist
Texture—gravelly ashy sandy loam, gravelly ashy loam, or very gravelly ashy sandy loam
Content of gravel—15 to 30 percent
Content of cobbles—0 to 5 percent

2C horizon:
Hue—2.5YR or 5YR
Value—4 or 5 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly sandy loam or very gravelly loam
Content of gravel—30 to 50 percent
Content of cobbles—0 to 10 percent

Remmel Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, generally on southerly aspects
Parent material: Volcanic ash (7 to 14 inches) over colluvium over glacial till from granitic rock
Slope: 35 to 65 percent
Elevation: 5,400 to 7,000 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Loamy-skeletal, isotic Andic Eutrocryepts

Typical Pedon

Remmel very stony ashy sandy loam, in an area of Remmel-Devore-Rock outcrop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; 1,220 feet west and 1,200 feet south of the northeast corner of sec. 32, T. 38 N., R. 21 E.; latitude 48 degrees 45 minutes 11 seconds north and longitude 120 degrees 14 minutes 16 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.
A—0 to 4 inches; dark grayish brown (10YR 4/2) very stony ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; few fine irregular pores; 15 percent gravel, 10 percent cobbles, and 15 percent stones; slightly acid; clear smooth boundary.
Bw1—4 to 8 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, dark brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium and coarse roots; common fine irregular pores; 15 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.
Bw2—8 to 13 inches; light yellowish brown (10YR 6/4) very gravelly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular

blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and few medium and coarse roots; few fine irregular pores; 30 percent gravel and 5 percent cobbles; slightly acid; clear smooth boundary.

2BC—13 to 29 inches; light yellowish brown (10YR 6/4) very cobbly sandy loam, yellowish brown (10YR 5/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; few fine irregular pores; 30 percent gravel, 15 percent cobbles, and 5 percent stones; slightly acid; clear wavy boundary.

2C1—29 to 41 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine irregular pores; 35 percent gravel, 20 percent cobbles, and 5 percent stones; neutral; gradual wavy boundary.

3C2—41 to 60 inches; pale brown (10YR 6/3) very cobbly loamy coarse sand, brown (10YR 5/3) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; 40 percent gravel, 20 percent cobbles, and 5 percent stones; neutral.

Range in Characteristics

Depth to loamy coarse sand (3C horizon): 40 to 60 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 65 percent
Soil moisture regime: Xeric

A horizon:
- Value—4 or 5 dry, 3 or 4 moist
- Chroma—2 or 3 dry or moist
- Content of gravel—10 to 20 percent
- Content of cobbles—5 to 15 percent
- Content of stones—15 to 25 percent

Bw horizon:
- Chroma—3 or 4 dry or moist
- Texture—gravelly or very gravelly ashy sandy loam
- Content of gravel—15 to 30 percent
- Content of cobbles—0 to 5 percent
- Content of stones—0 to 5 percent

2BC horizon:
- Value—4 or 5 moist
- Chroma—3 or 4 dry or moist
- Texture—very gravelly sandy loam, very cobbly sandy loam, or very cobbly coarse sandy loam
- Content of gravel—30 to 45 percent
- Content of cobbles—5 to 20 percent
- Content of stones—0 to 5 percent

2C horizon:
- Value—6 or 7 dry, 5 or 6 moist
- Chroma—2 or 3 dry or moist
- Texture—very gravelly sandy loam, very cobbly sandy loam, or very cobbly coarse sandy loam
- Content of gravel—35 to 50 percent
- Content of cobbles—5 to 20 percent
- Content of stones—0 to 5 percent

3C horizon:
- Value—6 or 7 dry, 5 or 6 moist
- Chroma—2 or 3 dry or moist

Texture—very gravelly or very cobbly loamy coarse sand
Content of gravel—30 to 50 percent
Content of cobbles—10 to 20 percent
Content of stones—0 to 5 percent

Rendovy Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and footslopes
Parent material: Volcanic ash (7 to 14 inches) over glacial till from sedimentary and volcanic rock
Slope: 35 to 65 percent
Elevation: 3,500 to 5,200 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Andic Palexeralfs

Typical Pedon

Rendovy gravelly ashy fine sandy loam, in an area of Rendovy-Goshawk complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 8 miles northwest of Winthrop, Washington; 1,900 feet west and 300 feet south of the northeast corner of sec. 25, T. 36 N., R. 20 E.; latitude 48 degrees 35 minutes 55 seconds north and longitude 120 degrees 16 minutes 49 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.
A—0 to 5 inches; brown (10YR 4/3) gravelly ashy fine sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; many very fine and fine irregular pores; 15 percent gravel; neutral; clear smooth boundary.
Bw—5 to 12 inches; brown (10YR 5/3) gravelly ashy sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; moderately smeary; many very fine and fine and few medium and coarse roots; many very fine and fine irregular pores; 15 percent gravel; neutral; clear smooth boundary.
2Bt1—12 to 24 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, grayish brown (10YR 5/2) moist; moderate fine subangular blocky structure; hard, firm, slightly sticky and slightly plastic; many very fine and fine and few medium roots; many very fine and fine irregular pores; few discontinuous faint clay films between sand grains; 30 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
3Bt2—24 to 35 inches; pale brown (10YR 6/3) very gravelly sandy clay loam, brown (10YR 5/3) moist; strong fine and medium subangular blocky structure; hard, firm, moderately sticky and moderately plastic; common very fine and fine and few medium and coarse roots; common fine irregular pores; few discontinuous faint clay films on faces of peds and in pores; 30 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
3Bt3—35 to 46 inches; light yellowish brown (10YR 6/4) very gravelly sandy clay loam, yellowish brown (10YR 5/4) moist; strong fine and medium subangular blocky structure; hard, firm, moderately sticky and moderately plastic; common very fine and fine and few medium and coarse roots; few fine and medium irregular pores; common discontinuous faint clay films on faces of peds, in pores, and between sand grains; 35 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.

3Bt4—46 to 60 inches; light yellowish brown (10YR 6/4) very gravelly sandy clay loam, yellowish brown (10YR 5/6) moist; moderate fine and medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; few fine and medium irregular pores; few discontinuous faint clay films between sand grains; 30 percent gravel and 5 percent cobbles; neutral.

Range in Characteristics

Depth to glacial till: 7 to 14 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 65 percent

A horizon:
- Value—4 or 5 dry, 2 or 3 moist
- Chroma—2 or 3 dry or moist

Bw horizon:
- Value—5 or 6 dry, 4 or 5 moist
- Chroma—3 or 4 dry or moist
- Texture—gravelly ashy sandy loam or gravelly ashy fine sandy loam

2Bt horizon:
- Value—5 or 6 dry, 4 or 5 moist
- Chroma—3 or 4 dry or moist
- Texture—very gravelly sandy loam or very gravelly sandy clay loam
- Content of gravel—30 to 40 percent
- Content of cobbles—5 to 10 percent

3Bt horizon:
- Value—5 or 6 dry, 4 or 5 moist
- Chroma—3 or 4 dry, 3 to 6 moist
- Texture—very gravelly sandy clay loam, very cobbly sandy clay loam, or very gravelly clay loam
- Content of gravel—25 to 45 percent
- Content of cobbles—5 to 20 percent

Republic Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and footslopes
Parent material: Mixed volcanic ash (7 to 15 inches) over glacial till and alluvium
Slope: 0 to 65 percent
Elevation: 2,500 to 4,700 feet
Mean annual precipitation: 17 to 20 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 130 days
Taxonomic classification: Coarse-loamy, isotic, frigid Vitrandic Haploxerolls

Typical Pedon

Republic ashy loam, in an area of Republic-Pelican complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 5 miles northwest of Conconully, Washington; Conconully West USGS quadrangle; 850 feet west and 1,300 feet north of the southeast corner of sec. 29, T. 36 N., R. 24 E.; latitude 48 degrees 35 minutes 11 seconds north and longitude 119 degrees 50 minutes 43 seconds west.

Oi—1 inch to 0; slightly decomposed mat of needles, twigs, and leaves.
A1—0 to 6 inches; dark grayish brown (10YR 4/2) ashy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; smeary; many very fine and few medium and coarse roots; common fine irregular pores; slightly acid; clear wavy boundary.
A2—6 to 15 inches; brown (10YR 5/3) ashy sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and nonplastic; many very fine and common medium and coarse roots; common fine irregular pores; 5 percent gravel; slightly acid; gradual wavy boundary.
2Bw1—15 to 28 inches; pale brown (10YR 6/3) sandy loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine, medium, and coarse roots; common fine irregular pores; 10 percent gravel; neutral; gradual wavy boundary.
2Bw2—28 to 35 inches; pale brown (10YR 6/3) gravelly sandy loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few fine and common medium and coarse roots; common fine irregular pores; 20 percent gravel and 10 percent cobbles; slightly alkaline; clear wavy boundary.
2C—35 to 60 inches; pale olive (5Y 6/3) very gravelly sandy loam, olive (5Y 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and medium roots; common fine irregular pores; 25 percent gravel and 10 percent cobbles; slightly alkaline.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 10 to 20 inches
Content of rock fragments in the particle-size control section: 5 to 35 percent
Thickness of the mollic epipedon: 10 to 20 inches

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—1 to 3 dry or moist

2Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Texture—loam, sandy loam, or gravelly sandy loam
Content of gravel—5 to 25 percent
Content of cobbles—0 to 10 percent

2C horizon:
Hue—10YR or 5Y
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Texture—gravelly or very gravelly sandy loam
Content of gravel—15 to 35 percent
Content of cobbles—0 to 10 percent

Resner Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Footslopes, toeslopes, backslopes, outwash terraces, and escarpments
Parent material: Volcanic ash (14 to 22 inches) over granitic outwash or ablation till

Slope: 0 to 65 percent
Elevation: 3,500 to 6,000 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 100 days
Taxonomic classification: Ashy over sandy or sandy-skeletal, glassy over isotic Xeric Vitricryands

Typical Pedon

Resner ashy fine sandy loam, in an area of Resner-Sitdown complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 1 mile northwest of Mount Bonaparte and 2 miles southeast of Havillah, Washington; 300 feet west and 1,500 feet south of the northeast corner of sec. 15, T. 38 N., R. 29 E.; latitude 48 degrees 47 minutes 40 seconds north and longitude 119 degrees 8 minutes 36 seconds west.

Oi—1 inch to 0; slightly decomposed mat of leaves, twigs, and needles.
C—0 to 1 inch; white (10YR 8/1) ashy silt loam, brown (10YR 5/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium and coarse roots; few fine pores; 5 percent gravel; strongly acid; abrupt smooth boundary.
2A—1 to 5 inches; pale brown (10YR 6/3) ashy fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium and coarse roots; few fine pores; 5 percent gravel; slightly acid; gradual wavy boundary.
2Bw—5 to 18 inches; light yellowish brown (10YR 6/4) ashy fine sandy loam, dark yellowish brown (10YR 4/6) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and common medium roots; few fine pores; 10 percent gravel; slightly acid; gradual wavy boundary.
3C—18 to 60 inches; light gray (2.5Y 7/2) very cobbly loamy sand, light olive brown (2.5Y 5/3) moist; single grain; loose, nonsticky and nonplastic; common fine and few medium and coarse roots; common fine irregular pores; 20 percent gravel, 30 percent cobbles, and 5 percent stones; slightly acid.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 14 to 22 inches
Depth to sandy-skeletal material (3C horizon): 14 to 22 inches
Rock fragments: 0 to 20 percent in the ashy layer and 35 to 70 percent subrounded granitic rock fragments in the glacial outwash
Note: Not all pedons have the thin C horizon directly below the organic layer. The C horizon consists of 140 to 190 year old “T” or 450 to 500 year old “W” ash from Mount Saint Helens.

C horizon (where present):
Texture—ashy silt loam

2A horizon:
Chroma—2 to 4 dry or moist
Texture—ashy loam or ashy fine sandy loam
Content of gravel—0 to 10 percent

2Bw horizon:
Value—6 or 7 dry
Chroma—3 to 6 dry or moist
Texture—ashy fine sandy loam or gravelly ashy fine sandy loam
Content of gravel—0 to 20 percent

3C horizon:
Hue—10YR or 2.5Y
Value—6 to 8 dry, 5 or 6 moist
Chroma—2 to 4 dry or moist
Texture—very cobbly loamy sand, extremely cobbly loamy sand, or extremely gravelly coarse sand
Content of gravel—20 to 50 percent
Content of cobbles—0 to 30 percent
Content of stones—0 to 5 percent

Ret Series

Soil depth: Very deep
Drainage class: Somewhat poorly drained
Landscape: Mountains
Position on landscape: Flood plains and low stream terraces
Parent material: Alluvium
Slope: 0 to 3 percent
Elevation: 1,600 to 3,800 feet
Mean annual precipitation: 14 to 20 inches
Mean annual air temperature: 42 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Coarse-loamy, isotic, frigid Cumulic Haploxerolls

Typical Pedon

Ret silt loam; Colville Indian Reservation, Washington; about 8 miles northeast of Disautel, Washington; about 1,500 feet north and 1,500 feet west of the southeast corner of sec. 19, T. 34 N., R. 30 E.; latitude 48 degrees 25 minutes 45 seconds north and longitude 119 degrees 5 minutes 18 seconds west.

A1—0 to 8 inches; very dark gray (10YR 3/1) silt loam, black (10YR 2/1) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common fine irregular pores; slightly alkaline; clear wavy boundary.

A2—8 to 16 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; common fine irregular pores; 2 percent rounded pebbles; slightly alkaline; gradual wavy boundary.

A3—16 to 22 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; common fine irregular pores; 5 percent rounded pebbles; neutral; clear wavy boundary.

Bw—22 to 30 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; common fine irregular pores; 5 percent rounded pebbles; neutral; clear wavy boundary.

C1—30 to 36 inches; pale brown (10YR 6/3) loamy sand, brown (10YR 4/3) moist; common fine faint dark yellowish brown (10YR 4/4, moist) redoximorphic concentrations; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; 10 percent rounded pebbles; neutral; clear wavy boundary.

C2—36 to 60 inches; very pale brown (10YR 7/3) loamy sand, brown (10YR 5/3) moist; common medium distinct yellowish brown (10YR 5/6, moist) redoximorphic concentrations; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; 10 percent rounded pebbles; neutral.

Range in Characteristics

Depth to sandy material (C horizon): 28 to more than 60 inches
Content of rock fragments in the particle-size control section: 3 to 15 percent
Thickness of the mollic epipedon: 20 to 34 inches
Seasonal high water table: Present in winter, spring, and summer

A horizon:
Value—3 to 5 dry, 2 or 3 moist
Chroma—1 or 2 dry or moist
Texture in the lower part—silt loam, very fine sandy loam, fine sandy loam, or loam
Content of gravel—0 to 10 percent

Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Texture—silt loam, sandy loam, or fine sandy loam
Content of gravel—0 to 15 percent

C horizon:
Value—5 to 7 dry, 3 to 5 moist
Chroma—2 or 3 dry or moist
Texture—silt loam to sand; commonly stratified
Content of gravel—0 to 20 percent

Rufus Series

Soil depth: Shallow
Drainage class: Well drained
Landscape: Foothills and mountains
Position on landscape: Backslopes and ridges, generally on southerly aspects
Parent material: Mixed volcanic ash (10 to 20 inches) mixed with residuum and colluvium from metasedimentary rock
Slope: 35 to 65 percent
Elevation: 3,000 to 4,700 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 100 to 140 days
Taxonomic classification: Loamy-skeletal, isotic, mesic Lithic Ultic Haploxerolls

Typical Pedon

Rufus stony ashy sandy loam, in an area of Rufus-Wynhoff-Rock outcrop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 2 miles north of Conconully, Washington; 1,000 feet east and 300 feet south of the northwest corner of sec. 30, T. 36 N., R. 25 E.; latitude 48 degrees 35 minutes 49 seconds north and longitude 119 degrees 44 minutes 52 seconds west.

A1—0 to 6 inches; dark grayish brown (10YR 4/2) stony ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; many fine irregular pores; 10 percent channers, 2 percent flagstones, and 5 percent stones; neutral; clear smooth boundary.
A2—6 to 14 inches; brown (10YR 4/3) very channery ashy sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; common fine irregular pores; 35 percent channers and 5 percent flagstones; neutral; clear wavy boundary.

Bw—14 to 18 inches; brown (10YR 5/3) very flaggy ashy sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; 35 percent channers and 25 percent flagstones; neutral; abrupt wavy boundary.
2R—18 inches; metasedimentary rock.

Range in Characteristics

Depth to bedrock: 10 to 20 inches
Thickness of the material influenced by mixed volcanic ash: 10 to 20 inches
Content of rock fragments in the particle-size control section: 35 to 70 percent

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3 dry or moist
Content of channers—10 to 35 percent
Content of flagstones—0 to 10 percent
Content of stones—0 to 10 percent

Bw horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—very channery, very flaggy, or extremely channery ashy sandy loam
Content of channers—35 to 50 percent
Content of flagstones—5 to 30 percent

Sacheen Series

Soil depth: Very deep
Drainage class: Somewhat excessively drained
Landscape: Mountains
Position on landscape: Terrace escarpments
Parent material: Outwash or glaciofluvial material from granitic sources
Slope: 15 to 65 percent
Elevation: 2,900 to 5,300 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Mixed, frigid Typic Xeropsamments

Typical Pedon

Sacheen loamy sand, in an area of Sacheen loamy sand, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 4 miles west of Wauconda, Washington; 1,700 feet west and 1,100 feet south of the northeast corner of sec. 1, T. 37 N., R. 29 E.; latitude 48 degrees 44 minutes 15 seconds north and longitude 119 degrees 6 minutes 38 seconds west.

A—0 to 5 inches; light brownish gray (10YR 6/2) loamy sand, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common fine irregular pores; 5 percent gravel; slightly acid; clear smooth boundary.
C1—5 to 15 inches; light gray (10YR 7/2) loamy sand, grayish brown (10YR 5/2) moist; single grain; loose, nonsticky and nonplastic; common very fine and fine and few medium roots; common fine irregular pores; 10 percent gravel; neutral; gradual wavy boundary.

C2—15 to 60 inches; light gray (10YR 7/2) loamy sand, grayish brown (10YR 5/2) moist; single grain; loose, nonsticky and nonplastic; common very fine and fine and few medium roots; common fine irregular pores; 5 percent gravel; neutral.

Range in Characteristics

Content of semirounded to rounded rock fragments in the particle-size control section:
0 to 25 percent

A horizon:
Value—4 to 6 dry, 2 to 4 moist
Chroma—1 or 2 dry or moist
Content of gravel—0 to 10 percent

C horizon:
Hue—10YR or 2.5Y
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 to 4 dry or moist
Texture—loamy sand, sand, or gravelly sand
Content of gravel—5 to 25 percent

Salcreek Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and footslopes
Parent material: Mixed volcanic ash (14 to 20 inches) over glacial till from metasedimentary rock
Slope: 15 to 65 percent
Elevation: 3,600 to 4,900 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Fine-loamy, isotic, frigid Vitrandic Argixerolls

Typical Pedon

Salcreek ashy loam, in an area of Salcreek ashy loam, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 2,550 feet west and 2,000 feet south of the northeast corner of sec. 27, T. 36 N., R. 24 E.; latitude 48 degrees 35 minutes 30 seconds north and longitude 120 degrees 48 minutes 31 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.
A—0 to 6 inches; dark grayish brown (10YR 4/2) ashy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; common fine and very fine tubular pores; 5 percent gravel; neutral; clear wavy boundary.
AB—6 to 13 inches; brown (10YR 5/3) ashy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; few fine irregular pores; 10 percent gravel; neutral; clear smooth boundary.
Bw—13 to 20 inches; yellowish brown (10YR 5/4) gravelly ashy sandy loam, dark brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; few very fine and fine pores; 15 percent gravel; neutral; clear wavy boundary.

2Bt1—20 to 28 inches; yellowish brown (10YR 5/4) gravelly sandy loam, dark brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common very fine and fine roots; few fine irregular pores; few discontinuous faint clay films on faces of peds; 25 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
2Bt2—28 to 35 inches; yellowish brown (10YR 5/4) gravelly clay loam, dark brown (10YR 4/3) moist; strong medium angular blocky structure; hard, firm, moderately sticky and moderately plastic; few very fine and fine roots; few fine irregular pores; few discontinuous faint clay films on faces of peds; 20 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
2Bt3—35 to 44 inches; yellowish brown (10YR 5/4) gravelly clay loam, dark brown (10YR 4/3) moist; strong medium and coarse angular blocky structure; very hard, firm, moderately sticky and moderately plastic; few very fine roots; few fine irregular pores; few discontinuous faint clay films on faces of peds; 20 percent gravel and 5 percent cobbles; neutral; gradual wavy boundary.
2Bt4—44 to 60 inches; yellowish brown (10YR 5/4) gravelly clay loam, dark brown (10YR 4/3) moist; strong fine and medium angular blocky structure; very hard, firm, moderately sticky and moderately plastic; few very fine roots; few fine irregular pores; few discontinuous faint clay films on faces of peds; 20 percent gravel; neutral.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 14 to 20 inches
Content of rock fragments in the particle-size control section: 15 to 30 percent
Thickness of the mollic epipedon: 10 to 18 inches

A horizon:
Value—3 or 4 dry, 2 or 3 moist
Content of gravel—0 to 10 percent

AB horizon:
Value—4 or 5 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—ashy sandy loam, ashy loam, or gravelly ashy loam
Content of gravel—5 to 15 percent

Bw horizon:
Value—4 or 5 dry, 3 or 4 moist
Chroma—3 or 4 dry
Texture—gravelly ashy sandy loam or gravelly ashy loam
Content of gravel—15 to 25 percent

2Bt horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 dry
Texture—gravelly clay loam, gravelly sandy clay loam, or gravelly sandy loam
Content of gravel—15 to 30 percent
Content of cobbles—0 to 3 percent

Santop Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and shoulders
Parent material: Mixed volcanic ash (10 to 18 inches) over residuum and colluvium from sedimentary and volcanic rock

Slope: 35 to 65 percent
Elevation: 2,600 to 5,100 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts

Typical Pedon

Santop gravelly ashy sandy loam, in an area of Nicmar-Santop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 8.5 miles northwest of Winthrop, Washington; 2,250 feet east and 1,350 feet north of the southwest corner of sec. 30, T. 36 N., R. 21 E.; latitude 48 degrees 35 minutes 18 seconds north and longitude 120 degrees 15 minutes 46 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.
A—0 to 5 inches; brown (10YR 5/3) gravelly ashy sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine irregular pores; 20 percent gravel and 5 percent cobbles; slightly acid; gradual wavy boundary.
Bw—5 to 15 inches; pale brown (10YR 6/3) very gravelly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; few fine and very fine irregular pores; 35 percent gravel and 5 percent cobbles; slightly acid; gradual wavy boundary.
2C—15 to 34 inches; pale brown (10YR 6/3) very stony sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots around rock fragments; few very fine and fine irregular pores; 25 percent gravel, 15 percent cobbles, and 20 percent stones; slightly acid; abrupt wavy boundary.
2R—34 inches; sandstone.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the material influenced by mixed volcanic ash: 10 to 18 inches
Content of rock fragments in the particle-size control section: 35 to 65 percent

A horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Content of gravel—15 to 25 percent
Content of cobbles—0 to 5 percent

Bw horizon:
Value—4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—very gravelly or very cobbly ashy sandy loam
Content of gravel—25 to 35 percent
Content of cobbles—5 to 15 percent

2C horizon:
Value—6 or 7 dry, 5 or 6 moist
Chroma—3 or 4 dry or moist
Texture—very gravelly, very cobbly, or very stony sandy loam
Content of gravel—25 to 40 percent

Content of cobbles—5 to 15 percent
Content of stones—0 to 20 percent

Scheiner Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Terrace escarpments
Parent material: Mixed volcanic ash (7 to 14 inches) over glaciofluvial material
Slope: 35 to 65 percent
Elevation: 3,400 to 4,200 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Sandy, isotic Vitrandic Eutrocryepts

Typical Pedon

Scheiner ashy sandy loam, in an area of Scheiner-Myerscreek complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 6 miles east of Conconully, Washington; 350 feet south and 1,350 feet west of the northeast corner of sec. 7, T. 35 N., R. 20 E.; latitude 48 degrees 31 minutes 12 seconds north and longitude 119 degrees 52 minutes 7 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, grass, and twigs; clear smooth boundary.
C—0 to 2 inches; light gray (10YR 7/2) ashy sandy loam, brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and medium and few very fine roots; many very fine and fine irregular pores; 5 percent gravel; moderately acid; gradual smooth boundary.
2A—2 to 7 inches; pale brown (10YR 6/3) ashy sandy loam, dark yellowish brown (10YR 4/4) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine, fine, and medium roots; many very fine and fine irregular pores; 5 percent gravel; slightly acid; clear smooth boundary.
2Bw—7 to 12 inches; very pale brown (10YR 7/3) ashy sandy loam, yellowish brown (10YR 5/4) moist; weak medium and coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; few fine and coarse and common medium roots; common fine irregular pores; 5 percent gravel; neutral; gradual smooth boundary.
3BC—12 to 16 inches; pale brown (10YR 6/3) loamy sand, grayish brown (10YR 5/2) moist; single grain; loose, nonsticky and nonplastic; few medium roots; many fine and medium irregular pores; 5 percent gravel; neutral; gradual smooth boundary.
3C1—16 to 48 inches; light gray (10YR 7/2) sand, light brownish gray (2.5Y 6/2) moist; single grain; loose, nonsticky and nonplastic; few fine and medium roots; many fine and medium irregular pores; 5 percent gravel; neutral; gradual smooth boundary.
3C2—48 to 60 inches; light gray (10YR 7/2) gravelly sand, light brownish gray (2.5Y 6/2) moist; single grain; loose, nonsticky and nonplastic; 30 percent gravel; neutral.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 5 to 30 percent
Soil moisture regime: Xeric

C horizon (where present):
Value—6 to 8 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Content of gravel—0 to 10 percent

2A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Content of gravel—0 to 10 percent

2Bw horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—ashy sandy loam or gravelly ashy sandy loam
Content of gravel—5 to 15 percent

3BC and 3C horizons:
Value—6 or 7 dry, 5 or 6 moist
Chroma—2 or 3 dry or moist
Texture—loamy sand, sand, gravelly sand, or coarse sand
Content of gravel—0 to 30 percent
Content of cobbles—0 to 10 percent

Scoap Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and footslopes
Parent material: Mixed volcanic ash (10 to 20 inches) over glacial till and colluvium derived from granitic and metamorphic rock
Slope: 15 to 35 percent
Elevation: 3,300 to 4,500 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 42 to 45 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Haploxerolls

Typical Pedon

Scoap gravelly ashy loam, in an area of Scoap gravelly ashy loam, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; northwest corner of sec. 14, T. 35 N., R. 31 E.; latitude 48 degrees 32 minutes 23 seconds north and longitude 118 degrees 54 minutes 21 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles, twigs, and leaves; abrupt smooth boundary.
A1—0 to 7 inches; dark grayish brown (10YR 4/2) gravelly ashy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common very fine and fine tubular pores; 15 percent gravel; neutral; clear smooth boundary.
A2—7 to 20 inches; dark grayish brown (10YR 4/2) gravelly ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common very fine and fine tubular pores; 15 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.

2Bw—20 to 32 inches; pale brown (10YR 6/3) very gravelly sandy loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; few fine irregular pores; 25 percent gravel and 10 percent cobbles; neutral; clear wavy boundary.
2BC—32 to 42 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; 35 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
2C—42 to 60 inches; pale brown (10YR 6/3) very gravelly sandy loam, grayish brown (10YR 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; 45 percent gravel and 5 percent cobbles; neutral.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 10 to 20 inches
Content of rock fragments in the particle-size control section: 35 to 65 percent
Thickness of the mollic epipedon: 20 to 30 inches

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3 dry or moist
Content of gravel—15 to 25 percent
Content of cobbles—0 to 5 percent

2Bw horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—very gravelly, very cobbly, or gravelly sandy loam
Content of gravel—15 to 30 percent
Content of cobbles—0 to 20 percent

2C horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—35 to 50 percent
Content of cobbles—5 to 20 percent
Content of stones—0 to 5 percent

Setill Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Foothills and mountains
Position on landscape: Backslopes and footslopes
Parent material: Mixed volcanic ash (10 to 20 inches) over glacial till from sedimentary and volcanic rock
Slope: 15 to 65 percent
Elevation: 3,000 to 4,400 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 100 to 130 days
Taxonomic classification: Loamy-skeletal, isotic, mesic Vitrandic Argixerolls

Typical Pedon

Setill ashy loam, in an area of Setill ashy loam, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 8 miles north of Winthrop, Washington;

2,600 feet east and 2,600 feet north of the southwest corner of sec. 19, T. 36 N., R. 21 E.; latitude 48 degrees 36 minutes 22 seconds north and longitude 120 degrees 15 minutes 42 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.

A1—0 to 6 inches; dark grayish brown (10YR 4/2) ashy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine tubular pores; 5 percent gravel; neutral; clear smooth boundary.

A2—6 to 10 inches; dark grayish brown (10YR 4/2) ashy loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; common fine and very fine tubular pores; 10 percent gravel; neutral; clear smooth boundary.

BA—10 to 19 inches; brown (10YR 5/3) gravelly ashy loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common very fine and fine pores; 20 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.

2Bt—19 to 26 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine irregular pores; few discontinuous faint clay films on faces of peds; 35 percent gravel and 5 percent cobbles; neutral; clear smooth boundary.

3Btd1—26 to 38 inches; pale brown (10YR 6/3) very gravelly clay loam, brown (10YR 5/3) moist; massive; very hard, firm, moderately sticky and slightly plastic; few very fine roots; few fine irregular pores; few fine and medium irregular yellowish brown (10YR 5/6) stains; few discontinuous faint clay films on faces of peds; 40 percent gravel and 5 percent cobbles; neutral; gradual wavy boundary.

3Btd2—38 to 60 inches; pale brown (10YR 6/3) very gravelly clay loam, brown (10YR 5/3) moist; massive; very hard, firm, moderately sticky and moderately plastic; few very fine roots; few fine irregular pores; few fine irregular yellowish brown (10YR 5/6) stains; few discontinuous faint clay films on faces of peds; 35 percent gravel and 3 percent cobbles; neutral.

Range in Characteristics

Depth to densic material: 25 to 35 inches
Thickness of the material influenced by mixed volcanic ash: 10 to 20 inches
Content of rock fragments in the particle-size control section: 35 to 50 percent
Thickness of the mollic epipedon: 10 to 20 inches

A horizon:
- Value—4 or 5 dry
- Chroma—2 or 3 dry
- Content of gravel—5 to 15 percent

BA horizon:
- Value—4 to 6 dry, 3 to 5 moist
- Chroma—2 or 3 dry or moist
- Texture—gravelly or very gravelly ashy loam
- Content of gravel—15 to 35 percent
- Content of cobbles—0 to 5 percent

2Bt horizon:
- Value—5 or 6 dry, 4 or 5 moist
- Chroma—3 or 4 moist

Texture—very gravelly loam or very gravelly clay loam
Content of gravel—30 to 40 percent
Content of cobbles—0 to 10 percent

3Btd horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 dry, 3 or 4 moist
Texture—very gravelly clay loam or very gravelly sandy clay loam
Content of gravel—30 to 45 percent
Content of cobbles—0 to 10 percents

Shalrock Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, shoulders, and ridges
Parent material: Mixed volcanic ash (7 to 20 inches) over colluvium and residuum from sedimentary and volcanic rock
Slope: 15 to 65 percent
Elevation: 3,400 to 5,000 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Haploxerolls

Typical Pedon

Shalrock very stony ashy sandy loam, in an area of Shalrock-Rock outcrop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 2,000 feet east and 900 feet north of the southwest corner of sec. 7, T. 36 N., R. 21 E.; latitude 48 degrees 37 minutes 50 seconds north and longitude 120 degrees 15 minutes 59 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.
A1—0 to 7 inches; very dark grayish brown (10YR 3/2) very stony ashy sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; common fine irregular pores; 20 percent gravel, 5 percent cobbles, and 15 percent stones; neutral; clear smooth boundary.
A2—7 to 10 inches; dark grayish brown (10YR 4/2) gravelly ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; common fine irregular pores; 20 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
Bw—10 to 15 inches; brown (10YR 5/3) very cobbly ashy sandy loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; few fine irregular pores; 25 percent gravel, 10 percent cobbles, and 5 percent stones; neutral; clear wavy boundary.
2C—15 to 24 inches; pale brown (10YR 6/3) very cobbly sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; few fine irregular pores; 35 percent gravel, 20 percent cobbles, and 5 percent stones; neutral; gradual wavy boundary.
2R—24 inches; sandstone.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the material influenced by mixed volcanic ash: 7 to 20 inches
Content of rock fragments in the particle-size control section: 40 to 65 percent
Thickness of the mollic epipedon: 7 to 12 inches

A horizon:
Value—3 or 4 dry, 2 or 3 moist
Content of gravel—10 to 20 percent
Content of cobbles—0 to 5 percent
Content of stones—15 to 30 percent

Bw horizon:
Value—4 or 5 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly or very cobbly ashy sandy loam
Content of gravel—25 to 30 percent
Content of cobbles—5 to 15 percent
Content of stones—0 to 5 percent

2C horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 moist
Texture—very cobbly or very gravelly sandy loam
Content of gravel—20 to 35 percent
Content of cobbles—15 to 30 percent
Content of stones—0 to 5 percent

Shermount Series

Soil depth: Shallow
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Shoulders and ridges, generally on southerly aspects
Parent material: Mixed volcanic ash (7 to 10 inches) over colluvium and residuum from sedimentary rock
Slope: 15 to 65 percent
Elevation: 5,000 to 6,200 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Loamy-skeletal, mixed, superactive Humic Lithic Dystrocryepts

Typical Pedon

Shermount channery ashy loam, in an area of Shermount-Verhart complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; 1,600 feet west and 700 feet south of the northeast corner of sec. 35, T. 37 N., R. 20 E.; latitude 48 degrees 40 minutes 10 seconds north and longitude 120 degrees 18 minutes 15 seconds west.

A—0 to 7 inches; brown (10YR 5/3) channery ashy loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure parting to moderate fine granular; soft, friable, nonsticky and nonplastic; many very fine and fine and few medium roots; few fine tubular pores; 20 percent channers; slightly acid; clear smooth boundary.

2C—7 to 18 inches; brown (10YR 5/3) very channery loam, dark brown (10YR 4/3) moist; massive; soft, friable, nonsticky and nonplastic; common very fine and fine roots; few fine tubular pores; 40 percent channers and 10 percent flagstones; slightly acid; clear wavy boundary.
2R—18 inches; shale.

Range in Characteristics

Depth to bedrock: 10 to 20 inches
Thickness of the material influenced by mixed volcanic ash: 7 to 10 inches
Content of rock fragments in the particle-size control section: 35 to 70 percent
Thickness of the umbric epipedon: 7 to 10 inches
Soil moisture regime: Xeric

A horizon:
Value—4 or 5 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Content of channers—15 to 25 percent

2C horizon:
Value—4 to 6 dry, 3 to 5 moist
Chroma—2 or 3 dry or moist
Texture—very channery loam, extremely channery loam, or very channery sandy loam
Content of channers—40 to 70 percent
Content of flagstones—0 to 10 percent

Sitdown Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, footslopes, outwash terraces, and terrace escarpments
Parent material: Volcanic ash (10 to 14 inches) over glacial outwash and ablation till
Slope: 0 to 65 percent
Elevation: 4,200 to 6,500 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 41 degrees F
Frost-free period: 60 to 90 days
Taxonomic classification: Sandy-skeletal, isotic Andic Eutrocryepts

Typical Pedon

Sitdown stony ashy sandy loam (fig. 8), in an area of Sitdown-Wellsfar-Rock outcrop complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 14 miles west-northwest of Loomis, Washington; 500 feet west and 2,100 feet south of the northeast corner of sec. 20, T. 39 N., R. 23 E.; latitude 48 degrees 51 minutes 57 seconds north and longitude 119 degrees 58 minutes 16 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles, leaves, and twigs; clear smooth boundary.
A—0 to 3 inches; light yellowish brown (10YR 6/4) stony ashy sandy loam, brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; common fine irregular pores; 10 percent gravel, 5 percent cobbles, and 5 percent stones; slightly acid; clear smooth boundary.

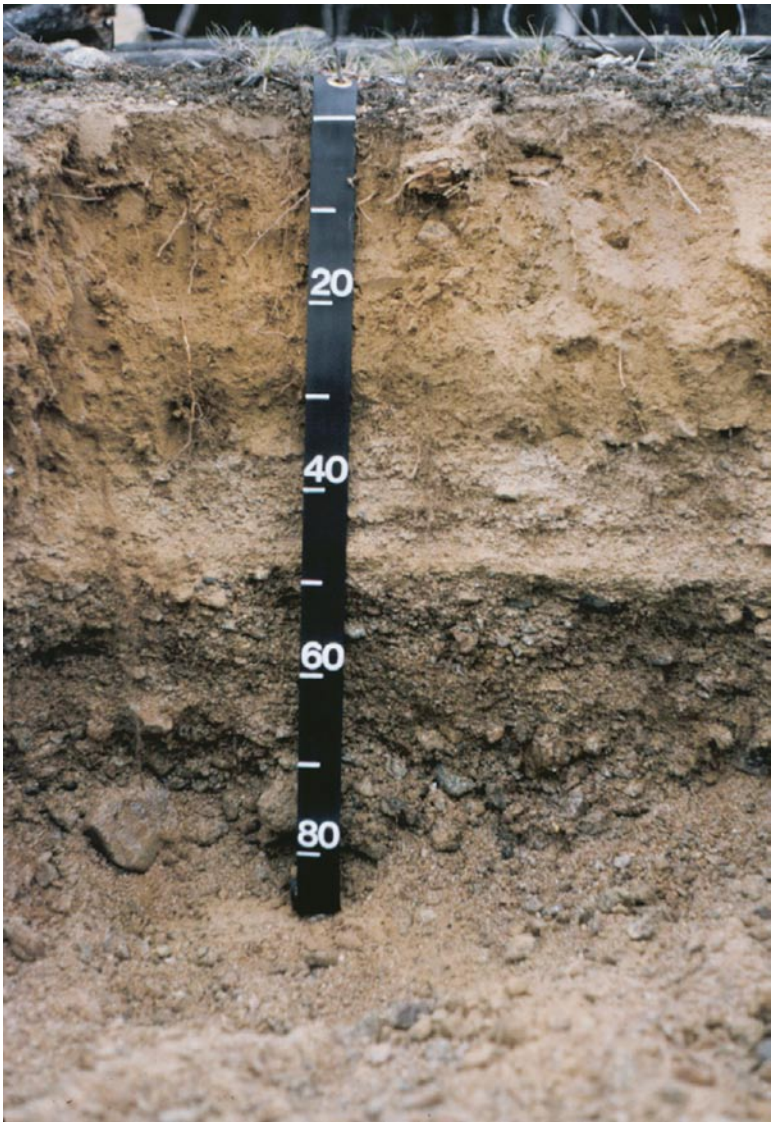

Figure 8.—Profile of Sitdown stony ashy sandy loam. The soil has 28 centimeters (11 inches) of volcanic ash over glacial outwash. Scale is in centimeters.

Bw—3 to 11 inches; light yellowish brown (10YR 6/4) gravelly ashy sandy loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine, common medium, and few coarse roots; few irregular pores; 20 percent gravel, 5 percent cobbles, and 5 percent stones; slightly acid; clear smooth boundary.

2C1—11 to 24 inches; very pale brown (10YR 7/3) very cobbly loamy sand, brown (10YR 5/3) moist; single grain; loose, nonsticky and nonplastic; common very fine and fine and few medium roots; 30 percent gravel, 20 percent cobbles, and 5 percent stones; slightly acid; gradual wavy boundary.

2C2—24 to 60 inches; light gray (10YR 7/2) extremely gravelly loamy sand, light brownish gray (10YR 6/2) moist; single grain; loose, nonsticky and nonplastic; 65 percent gravel and 5 percent cobbles; slightly acid.

Range in Characteristics

Depth to outwash and till: 10 to 14 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches thick
Content of rock fragments in the particle-size control section: 35 to 65 percent
Soil moisture regime: Xeric
Note: Some pedons have a thin C horizon directly below the organic layer. The C horizon consists of 140 to 190 year old “T” or 450 to 500 year old “W” ash from Mount Saint Helens.

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Texture—stony or gravelly ashy sandy loam
Content of gravel—10 to 20 percent
Content of cobbles—0 to 5 percent
Content of stones—0 to 15 percent

Bw horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 to 6 dry, 3 or 4 moist
Texture—stony or gravelly ashy sandy loam
Content of gravel—10 to 30 percent
Content of cobbles—0 to 5 percent
Content of stones—0 to 15 percent

2C horizon:
Hue—2.5Y or 10YR
Value—6 or 7 dry, 5 or 6 moist
Chroma—2 or 3 dry or moist
Texture—very stony, very cobbly, extremely cobbly, extremely gravelly, or gravelly loamy sand
Content of gravel—30 to 65 percent
Content of cobbles—5 to 20 percent
Content of stones—0 to 20 percent

Smokejump Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Shoulders, backslopes, and broad ridges, generally on northerly aspects
Parent material: Volcanic ash (7 to 14 inches) over colluvium and residuum from gneiss, granodiorite, and granitic rock
Slope: 15 to 65 percent
Elevation: 4,800 to 6,800 feet
Mean annual precipitation: 35 to 40 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days
Taxonomic classification: Loamy-skeletal, isotic, Andic Dystrocryepts

Typical Pedon

Smokejump stony ashy fine sandy loam, in an area of Smokejump-Twentymile complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 1,500 feet west and 1,700 feet north of the southeast corner of sec. 9, T. 37 N., R.

23 E.; latitude 48 degrees 43 minutes 2 seconds north and longitude 119 degrees 57 minutes 13 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, twigs, and leaves; abrupt smooth boundary.

A—0 to 4 inches; pale brown (10YR 6/3) stony ashy fine sandy loam, dark brown (10YR 4/3) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and few medium and coarse roots; common fine and medium tubular pores; 15 percent gravel, 5 percent cobbles, and 10 percent stones; moderately acid; clear wavy boundary.

Bw—4 to 13 inches; light yellowish brown (10YR 6/4) very stony ashy sandy loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium and coarse roots; common fine and medium tubular pores; 20 percent gravel, 10 percent cobbles, and 15 percent stones; moderately acid; gradual wavy boundary.

2C1—13 to 28 inches; very pale brown (10YR 7/4) very stony sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common very fine and fine irregular pores; 25 percent gravel, 10 percent cobbles, and 20 percent stones; slightly acid; gradual wavy boundary.

2C2—28 to 32 inches; very pale brown (10YR 7/4) extremely stony sandy loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine roots; 30 percent gravel, 10 percent cobbles, and 30 percent stones; moderately acid; gradual wavy boundary.

2R—32 inches; fractured granodiorite.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 85 percent
Soil moisture regime: Udic

A horizon:

- Chroma—3 or 4 dry
- Content of gravel—10 to 20 percent
- Content of cobbles—0 to 10 percent
- Content of stones—5 to 15 percent

Bw horizon:

- Chroma—3 or 4 dry or moist
- Texture—very stony or very cobbly ashy sandy loam
- Content of gravel—10 to 20 percent
- Content of cobbles—10 to 20 percent
- Content of stones—10 to 20 percent

2C horizons:

- Value—5 to 7 dry, 4 or 5 moist
- Chroma—2 to 4 dry or moist
- Texture—extremely stony sandy loam, extremely stony coarse sandy loam, extremely cobbly sandy loam, very stony sandy loam, or very stony coarse sandy loam
- Content of gravel—15 to 30 percent
- Content of cobbles—10 to 30 percent
- Content of stones—10 to 30 percent

Springdale Series

Soil depth: Very deep
Drainage class: Somewhat excessively drained
Landscape: Mountains
Position on landscape: Terraces, backslopes, footslopes, and escarpments
Parent material: Mixed volcanic ash (10 to 19 inches) over glacial outwash from granitic rock
Slope: 15 to 65 percent
Elevation: 2,800 to 3,800 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 100 to 130 days
Taxonomic classification: Sandy-skeletal, isotic, mesic Vitrandic Haploxerepts

Typical Pedon

Springdale cobbly ashy coarse sandy loam, in an area of Springdale cobbly ashy coarse sandy loam, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 5 miles northeast of Winthrop, Washington; Lewis Butte USGS quadrangle; sec. 1, R. 22 E., T. 35 N.; latitude 48 degrees 33 minutes 20 seconds north and longitude 119 degrees 8 minutes 22 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, twigs, and leaves.
A—0 to 3 inches; grayish brown (10YR 5/2) cobbly ashy coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common fine irregular pores; 10 percent gravel and 15 percent cobbles; slightly acid; clear smooth boundary.
Bw—3 to 11 inches; light yellowish brown (10YR 6/4) gravelly ashy coarse sandy loam, yellowish brown (10YR 5/4) moist; weak fine subangular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; common fine irregular pores; 20 percent gravel and 10 percent cobbles; neutral; clear smooth boundary.
2C1—11 to 24 inches; very pale brown (10YR 7/3) very gravelly loamy sand, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; 35 percent gravel, 15 percent cobbles, and 5 percent stones; neutral; clear wavy boundary.
2C2—24 to 60 inches; very pale brown (10YR 8/3) very gravelly coarse sand, light yellowish brown (10YR 6/4) moist; single grain; loose, nonsticky and nonplastic; few fine and very fine roots; 40 percent gravel, 15 percent cobbles, and 5 percent stones; neutral.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 10 to 19 inches
Depth to sandy-skeletal material (2C horizon): 10 to 19 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Content of gravel—10 to 20 percent
Content of cobbles—10 to 15 percent

Bw horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—gravelly or very gravelly ashy coarse sandy loam

Content of gravel—20 to 35 percent
Content of cobbles—0 to 10 percent

2C horizon:
Value—7 or 8 dry, 5 or 6 moist
Chroma—2 to 4 dry or moist
Texture—very gravelly or extremely gravelly loamy sand, very gravelly coarse sand, or very gravelly loamy coarse sand
Content of gravel—35 to 50 percent
Content of cobbles—5 to 15 percent
Content of stones—0 to 5 percent

Stapaloop Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Terraces, toeslopes, and footslopes
Parent material: Mixed volcanic ash (7 to 21 inches) over glaciofluvial material
Slope: 0 to 25 percent
Elevation: 3,400 to 4,800 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 95 to 120 days
Taxonomic classification: Coarse-loamy, isotic, frigid Vitrandic Haploxerepts

Typical Pedon

Stapaloop ashy fine sandy loam, in an area of Stapaloop ashy fine sandy loam, 0 to 25 percent slopes; Okanogan National Forest Area, Washington; about 2.5 miles south of Wauconda, Washington; 550 feet east and 2,700 feet north of the southwest corner of sec. 21, T. 37 N., R. 30 E.; latitude 48 degrees 41 minutes 24 seconds north and longitude 119 degrees 3 minutes 8 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, twigs, and leaves; abrupt smooth boundary.
A—0 to 3 inches; light brownish gray (10YR 6/2) ashy fine sandy loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; few very fine and fine pores; slightly acid; clear wavy boundary.
Bw1—3 to 13 inches; pale brown (10YR 6/3) ashy fine sandy loam, brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; common very fine and fine pores; slightly acid; gradual wavy boundary.
Bw2—13 to 21 inches; pale brown (10YR 6/3) ashy fine sandy loam, brown (10YR 4/3) moist; weak medium and coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common very fine and fine pores; slightly acid; gradual wavy boundary.
2C1—21 to 34 inches; pale brown (10YR 6/3) fine sandy loam, grayish brown (10YR 5/2) moist; massive; slightly hard, friable, slightly sticky and nonplastic; common very fine and fine and few medium roots; few very fine pores; 5 percent gravel; slightly acid; clear wavy boundary.
2C2—34 to 50 inches; pale brown (10YR 6/3) very fine sandy loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few very fine and fine roots; few very fine pores; 5 percent gravel; slightly acid; clear wavy boundary.

2C3—50 to 60 inches; pale brown (10YR 6/3) very fine sandy loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and nonplastic; 10 percent gravel and 5 percent cobbles; slightly acid.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 7 to 21 inches
Content of rock fragments in the particle-size control section: 0 to 25 percent

A horizon:
- Value—5 or 6 dry, 4 or 5 moist
- Chroma—2 or 3 dry or moist
- Content of gravel—0 to 5 percent

Bw horizon:
- Value—6 or 7 dry, 4 or 5 moist
- Chroma—2 or 3 dry or moist
- Texture—ashy fine sandy loam or ashy sandy loam
- Content of gravel—0 to 10 percent

2C horizon:
- Hue—10YR or 2.5Y
- Value—6 or 7 dry, 4 or 5 moist
- Chroma—2 to 4 dry or moist
- Texture of the 2C1 horizon—fine sandy loam, gravelly sandy loam, or sandy loam
- Texture of the 2C2 and 2C3 horizons—very fine sandy loam, gravelly fine sandy loam, or gravelly loamy fine sand
- Content of gravel—0 to 30 percent

Stemilt Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes
Parent material: Mixed volcanic ash (10 to 22 inches) over colluvium from sedimentary and volcanic rock
Slope: 35 to 65 percent
Elevation: 2,350 to 4,100 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 100 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Argixerolls

Typical Pedon

Stemilt gravelly ashy sandy loam, in an area of Stemilt-Midpeak complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 12 miles west of Twisp, Washington; about 1,500 feet west and 800 feet north of the southeast corner of sec. 33, T. 34 N., R. 20 E.; latitude 48 degrees 23 minutes 56 seconds north and longitude 120 degrees 20 minutes 41 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, twigs, and leaves; abrupt smooth boundary.
A1—0 to 7 inches; grayish brown (10YR 5/2) gravelly ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; many fine tubular pores; 20 percent gravel; neutral; clear wavy boundary.

A2—7 to 12 inches; brown (10YR 5/3) gravelly ashy sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; many fine tubular pores; 30 percent gravel; neutral; gradual wavy boundary.

Bw—12 to 21 inches; grayish brown (10YR 5/2) very gravelly ashy sandy loam, brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine irregular pores; 35 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.

2Bt1—21 to 32 inches; brown (7.5YR 5/3) very gravelly clay loam, brown (7.5YR 4/3) moist; strong fine and medium subangular blocky structure; very hard, firm, moderately sticky and moderately plastic; common very fine and fine roots; few fine irregular pores; continuous faint clay films on faces of peds; 40 percent gravel and 5 percent cobbles; slightly acid; gradual wavy boundary.

2Bt2—32 to 46 inches; brown (7.5YR 5/3) very gravelly clay loam, brown (7.5YR 4/3) moist; strong medium subangular blocky structure; very hard, firm, moderately sticky and moderately plastic; common very fine and fine roots; few fine irregular pores; continuous faint clay films on faces of peds; 40 percent gravel and 5 percent cobbles; slightly acid; gradual wavy boundary.

2Bt3—46 to 60 inches; brown (7.5YR 5/3) very gravelly clay loam, brown (7.5YR 4/3) moist; strong medium subangular blocky structure; very hard, firm, moderately sticky and moderately plastic; few very fine and fine roots; few fine irregular pores; continuous faint clay films on faces of peds; 45 percent gravel and 5 percent cobbles; slightly acid.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 10 to 22 inches
Content of rock fragments in the particle-size control section: 35 to 55 percent
Thickness of the mollic epipedon: 10 to 18 inches

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3 dry or moist
Content of gravel—15 to 30 percent

Bw horizon:
Value—4 or 5 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly ashy sandy loam or very gravelly ashy loam
Content of gravel—25 to 45 percent
Content of cobbles—0 to 15 percent

2Bt horizon:
Hue—10YR or 7.5YR
Value—4 or 5 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly clay loam or very gravelly sandy clay loam
Content of gravel—35 to 55 percent
Content of cobbles—0 to 15 percent
Content of stones—0 to 5 percent

Stepstone Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains

Position on landscape: Backslopes, footslopes, toeslopes
Parent material: Volcanic ash (14 to 24 inches) over glacial till derived from granite
Slope: 3 to 35 percent
Elevation: 3,000 to 5,000 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Ashy over sandy or sandy-skeletal, glassy over isotic, frigid Typic Vitrixerands

Typical Pedon

Stepstone ashy fine sandy loam, in an area of Louploup-Stepstone complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 2.5 miles east of Sweat Creek campground; 1,200 feet west and 2,200 feet south of the northeast corner of sec. 24, T. 37 N., R. 31 E.; latitude 48 degrees 41 minutes 58 seconds north and longitude 118 degrees 50 minutes 26 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, twigs, and grass.
A—0 to 1 inch; pale brown (10YR 6/3) ashy fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many fine and few medium roots; common fine irregular pores; 5 percent gravel; slightly acid; abrupt smooth boundary.
Bw1—1 to 5 inches; pale brown (10YR 6/3) ashy fine sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium and coarse roots; common fine irregular pores; 3 percent gravel; neutral; clear smooth boundary.
Bw2—5 to 18 inches; light yellowish brown (10YR 6/4) ashy fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium and fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine, fine, and medium roots; common fine irregular pores; 5 percent gravel; slightly acid; clear wavy boundary.
2CB—18 to 22 inches; light gray (2.5Y 7/2) very gravelly sandy loam, grayish brown (2.5Y 5/2) moist; weak medium and fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few fine and medium roots; few fine irregular pores; 25 percent gravel and 10 percent cobbles; slightly acid; gradual wavy boundary.
2C1—22 to 38 inches; white (2.5Y 8/2) very gravelly loamy sand, grayish brown (2.5Y 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few fine irregular pores; 30 percent gravel and 15 percent cobbles; slightly acid; gradual wavy boundary.
2C2—38 to 60 inches; pale yellow (2.5Y 8/3) very gravelly loamy sand, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few very fine irregular pores; 40 percent gravel and 15 percent cobbles; slightly acid.

Range in Characteristics

Depth to glacial till: 14 to 24 inches
Thickness of the material influenced by volcanic ash: 14 to 24 inches
Rock fragments: 0 to 20 percent in the ash layer and 35 to 65 percent semirounded granitic rock fragments in the glacial till
Note: Some pedons have a thin C horizon directly below the organic layer. The C horizon consists of 140 to 190 year old “T” or 450 to 500 year old “W” ash from Mount Saint Helens.

A horizon:
Value—5 to 7 dry, 3 to 5 moist
Chroma—2 or 3 dry or moist
Content of gravel—0 to 10 percent

Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Texture—ashy fine sandy loam or gravelly ashy fine sandy loam
Content of gravel—0 to 20 percent
Content of cobbles—0 to 15 percent

2CB horizon:
Hue—10YR or 2.5Y
Value—6 or 7 dry, 5 or 6 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly or gravelly sandy loam
Content of gravel—10 to 25 percent
Content of cobbles—0 to 15 percent

2C horizon:
Hue—10YR or 2.5Y
Value—6 to 8 dry, 5 or 6 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly, extremely gravelly, or very cobbly loamy sand
Content of gravel—25 to 55 percent
Content of cobbles—5 to 20 percent
Content of stones—0 to 10 percent

Storer Series

Soil depth: Deep
Drainage class: Well drained
Landscape: Foothills and mountains
Position on landscape: Backslopes and shoulders, generally on southerly aspects
Parent material: Residuum and colluvium from metavolcanic and metamorphic rock
Slope: 35 to 75 percent
Elevation: 2,600 to 4,000 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 47 to 52 degrees F
Frost-free period: 100 to 130 days
Taxonomic classification: Loamy-skeletal, mixed, superactive, mesic Typic Haploxerolls

Typical Pedon

Storer gravelly sandy loam, in an area of Storer-Swakane-Rock outcrop complex, 35 to 75 percent slopes; Okanogan National Forest Area, Washington; about 6 miles northeast of Twisp, Washington; 1,800 feet east and 250 feet south of the northwest corner of sec. 25, T. 34 N., R. 22 E.; latitude 48 degrees 25 minutes 26 seconds north and longitude 120 degrees 1 minute 36 seconds west.

A1—0 to 5 inches; dark grayish brown (10YR 4/2) gravelly sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common very fine and fine irregular pores; 20 percent angular pebbles; neutral; clear wavy boundary.

A2—5 to 12 inches; grayish brown (10YR 5/2) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common very fine and fine irregular pores; 35 percent angular pebbles; neutral; gradual wavy boundary.

Bw—12 to 19 inches; grayish brown (10YR 5/2) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; few fine irregular pores; 40 percent angular pebbles; neutral; clear wavy boundary.

C1—19 to 31 inches; brown (10YR 5/3) extremely gravelly sandy loam, dark brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine irregular pores; 55 percent angular pebbles and 10 channers; neutral; gradual wavy boundary.

C2—31 to 42 inches; brown (10YR 5/3) extremely channery sandy loam, dark brown (10YR 4/3) moist; massive; soft, very friable, slightly sticky and nonplastic; few very fine roots; 25 percent angular pebbles and 40 percent channers; slightly acid; gradual wavy boundary.

R—42 inches; fractured metavolcanic rock.

Range in Characteristics

Depth to bedrock: 40 to 60 inches
Thickness of the mollic epipedon: 10 to 15 inches
Content of rock fragments in the particle-size control section: 35 to 70 percent

A1 horizon:
- Value—3 or 4 dry, 2 or 3 moist
- Chroma—2 or 3 dry or moist
- Content of gravel—15 to 20 percent

A2 horizon:
- Value—4 or 5 dry, 2 or 3 moist
- Chroma—2 or 3 dry or moist
- Texture—gravelly or very gravelly sandy loam
- Content of gravel—15 to 40 percent

Bw horizon:
- Value—4 or 5 dry, 3 or 4 moist
- Chroma—2 or 3 dry or moist
- Content of gravel—30 to 45 percent
- Content of cobbles—0 to 5 percent

C horizon:
- Value—5 or 6 dry, 4 or 5 moist
- Chroma—2 to 4 dry, 2 or 3 moist
- Texture—very gravelly, extremely gravelly, or extremely channery sandy loam
- Content of gravel—25 to 55 percent
- Content of channers—10 to 40 percent

Surgh Series

Soil depth: Deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, shoulders, and broad ridges, generally on northerly aspects

Parent material: Volcanic ash (7 to 14 inches) over residuum and colluvium from granitic and metamorphic rock
Slope: 15 to 65 percent
Elevation: 4,800 to 6,100 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 60 to 90 days
Taxonomic classification: Loamy-skeletal, isotic Andic Eutrocryepts

Typical Pedon

Surgh very stony ashy sandy loam, in an area of Surgh very stony ashy sandy loam, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 7 miles southwest of Conconully, Washington; 2,000 feet west and 1,300 feet south of the northeast corner of sec. 24, T. 35 N., R. 23 E.; latitude 48 degrees 31 minutes 5 seconds north and longitude 119 degrees 53 minutes 49 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles, twigs, and leaves; abrupt smooth boundary.
C—0 to 1 inch; light gray (10YR 7/2) very stony ashy fine sandy loam, grayish brown (10YR 5/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; common fine and medium tubular pores; 10 percent gravel, 10 percent cobbles, and 15 percent stones; moderately acid; abrupt smooth boundary.
2A—1 to 4 inches; pale brown (10YR 6/3) very stony ashy sandy loam, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium and coarse roots; common fine and medium tubular pores; 15 percent gravel, 10 percent cobbles, and 15 percent stones; slightly acid; clear wavy boundary.
2Bw1—4 to 12 inches; light yellowish brown (10YR 6/4) stony ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; moderately smeary; many very fine and fine and few medium and coarse roots; common fine, medium, and coarse tubular pores; 10 percent gravel, 5 percent cobbles, and 15 percent stones; slightly acid; clear wavy boundary.
3Bw2—12 to 18 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; common fine and medium tubular pores; 20 percent gravel, 15 percent cobbles, and 5 percent stones; slightly acid; gradual wavy boundary.
3C1—18 to 32 inches; pale brown (10YR 6/3) very cobbly coarse sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; few fine and medium tubular pores; 25 percent gravel, 20 percent cobbles, and 5 percent stones; moderately acid; gradual wavy boundary.
3C2—32 to 45 inches; pale brown (10YR 6/3) very cobbly coarse sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; few fine and medium pores; 25 percent gravel, 25 percent cobbles, and 5 percent stones; moderately acid; diffuse wavy boundary.
3R—45 inches; fractured granite.

Range in Characteristics

Depth to bedrock: 40 to 60 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 65 percent
Soil moisture regime: Xeric

C horizon:
Value—7 or 8 dry, 5 to 7 moist
Chroma—I or 2 dry or moist
Content of gravel—5 to 15 percent
Content of cobbles—0 to 10 percent
Content of stones—15 to 20 percent

2A horizon:
Chroma—3 or 4 dry or moist
Content of gravel—10 to 20 percent
Content of cobbles—0 to 10 percent
Content of stones—15 to 20 percent

2Bw horizon:
Hue—7.5YR or 10YR
Value—4 to 6 dry, 3 to 5 moist
Chroma—3 or 4 dry or moist
Texture—stony, cobbly, or gravelly ashy sandy loam
Content of gravel—10 to 20 percent
Content of cobbles—0 to 15 percent
Content of stones—0 to 15 percent

3Bw horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—very cobbly, very gravelly, or very stony sandy loam
Content of gravel—15 to 25 percent
Content of cobbles—5 to 20 percent
Content of stones—5 to 25 percent

3C horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—very cobbly coarse sandy loam, very stony coarse sandy loam, very gravelly sandy loam, or very cobbly sandy loam
Content of gravel—20 to 30 percent
Content of cobbles—5 to 25 percent
Content of stones—5 to 25 percent

Swakane Series

Soil depth: Shallow
Drainage class: Well drained
Landscape: Foothills and mountains
Position on landscape: Shoulders, ridges, and backslopes, generally on southerly aspects
Parent material: Mixed volcanic ash (7 to 12 inches) over residuum and colluvium from granitic and metamorphic rock
Slope: 15 to 75 percent
Elevation: 2,000 to 4,900 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 130 days
Taxonomic classification: Loamy-skeletal, mixed, superactive, mesic Lithic Ultic Haploxerolls

Typical Pedon

Swakane very stony ashy sandy loam, in an area of Swakane-Rock outcrop-Peka complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 7.5 miles north of Winthrop, Washington; 2,000 feet east and 500 feet south of the northwest corner of sec. 36, T. 36 N., R. 21 E.; latitude 48 degrees 35 minutes 0 seconds north and longitude 120 degrees 9 minutes 18 seconds west.

A1—0 to 4 inches; dark grayish brown (10YR 4/2) very stony ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and very fine roots; few fine pores; 20 percent gravel, 10 percent cobbles, and 10 percent stones; neutral; clear smooth boundary.

A2—4 to 11 inches; dark grayish brown (10YR 4/2) very gravelly ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and very fine roots; few fine pores; 25 percent gravel, 15 percent cobbles, and 5 percent stones; neutral; clear wavy boundary.

2Bw—11 to 17 inches; brown (10YR 5/3) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many fine and very fine roots; few fine pores; 30 percent gravel, 10 percent cobbles, and 5 percent stones; slightly alkaline; clear wavy boundary.

2R—17 inches; granite.

Range in Characteristics

Depth to bedrock: 10 to 20 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent
Thickness of the material influenced by mixed volcanic ash: 7 to 12 inches
Thickness of the mollic epipedon: 7 to 12 inches

A horizon:
- Value—3 or 4 dry, 2 or 3 moist
- Content of gravel—10 to 30 percent
- Content of cobbles—0 to 15 percent
- Content of stones—0 to 10 percent

2Bw horizon:
- Chroma—2 or 3 dry or moist
- Texture—very cobbly, very gravelly, or extremely gravelly sandy loam
- Content of gravel—20 to 45 percent
- Content of cobbles—10 to 20 percent
- Content of stones—0 to 10 percent

Sycreek Series

Soil depth: Moderately deep or deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Sideslopes and footslopes
Parent material: Mixed volcanic ash (10 to 15 inches) over glacial till from sedimentary and some volcanic rock
Slope: 5 to 35 percent
Elevation: 2,800 to 4,600 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F

Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Argixerolls

Typical Pedon

Sycreek ashy loam, in an area of Sycreek ashy loam, 5 to 35 percent slopes; Okanogan National Forest Area, Washington; about 8 miles northwest of Winthrop, Washington; 900 feet west and 400 feet south of the northeast corner of sec. 30, T. 36 N., R. 21 E.; latitude 48 degrees 35 minutes 52 seconds north and longitude 120 degrees 15 minutes 15 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.
A—0 to 6 inches; very dark brown (10YR 2/2) ashy loam, black (10YR 2/1) moist; moderate fine and medium subangular blocky structure parting to moderate fine and medium granular; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; common fine tubular pores; 5 percent gravel; slightly acid; clear wavy boundary.
AB—6 to 14 inches; very dark grayish brown (10YR 3/2) ashy loam, very dark brown (10YR 2/2) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine, common medium, and few coarse roots; common fine tubular pores; 10 percent gravel; slightly acid; clear wavy boundary.
2Bt1—14 to 25 inches; light yellowish brown (10YR 6/4) very gravelly sandy clay loam, yellowish brown (10YR 5/4) moist; moderate medium angular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine and few medium roots; few fine irregular pores; few discontinuous faint clay films on faces of peds; 35 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
2Bt2—25 to 42 inches; brown (10YR 5/3) very gravelly sandy clay loam, dark brown (10YR 4/3) moist; moderate fine and medium angular blocky structure; hard, friable, moderately sticky and slightly plastic; few fine and medium roots; few fine irregular pores; few discontinuous faint clay films on faces of peds; 35 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
3CBd—42 to 60 inches; light brownish gray (10YR 6/2) very gravelly clay loam, brown (10YR 5/3) moist; massive; very hard, friable, moderately sticky and moderately plastic; few very fine roots; few very fine irregular pores; few fine and medium irregular dark yellowish brown (10YR 4/6, moist) stains; 30 percent gravel and 10 percent cobbles; neutral (pH 7.0).

Range in Characteristics

Depth to densic material: 35 to 45 inches
Thickness of the material influenced by mixed volcanic ash: 10 to 15 inches
Content of rock fragments in the particle-size control section: 35 to 55 percent
Thickness of the mollic epipedon: 10 to 15 inches

A horizon:
Value—2 or 3 dry
Chroma—1 or 2 dry or moist
Content of gravel—0 to 5 percent

AB horizon:
Value—3 or 4 dry, 2 or 3 moist
Chroma—2 or 3 dry or moist
Texture—ashy loam or gravelly ashy loam
Content of gravel—5 to 20 percent

2Bt horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—very gravelly sandy clay loam or very gravelly clay loam
Content of gravel—25 to 35 percent
Content of cobbles—0 to 10 percent

3CBd horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly clay loam or very gravelly sandy clay loam
Content of gravel—25 to 40 percent
Content of cobbles—5 to 10 percent

Thout Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Shoulders, ridges, benches, and backslopes
Parent material: Mixed volcanic ash (7 to 14 inches) over residuum and colluvium from sedimentary and volcanic rock
Slope: 15 to 65 percent
Elevation: 2,700 to 5,200 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 40 to 45 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Haploxerepts

Typical Pedon

Thout gravelly ashy sandy loam, in an area of Thout-Rock outcrop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 3 miles northwest of Mazama, Washington; 1,000 feet east and 1,200 feet south of the northwest corner of sec. 14, T. 36 N., R. 19 E.; latitude 48 degrees 37 minutes 31 seconds north and longitude 120 degrees 26 minutes 33 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.
A—0 to 4 inches; brown (10YR 5/3) gravelly ashy sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; many fine irregular pores; 15 percent angular pebbles; slightly acid; clear smooth boundary.
Bw1—4 to 11 inches; pale brown (10YR 6/3) very gravelly ashy sandy loam, dark brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; many fine irregular pores; 30 percent angular pebbles and 10 percent angular cobbles; moderately acid; clear wavy boundary.
2Bw2—11 to 24 inches; pale brown (10YR 6/3) very gravelly sandy loam, dark brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common fine pores; 35 percent gravel and 10 percent cobbles; moderately acid; abrupt wavy boundary.
2R—24 inches; andesite.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the material influenced by mixed volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent

A horizon:
- Value—4 to 6 dry, 2 or 3 moist
- Chroma—2 or 3 dry or moist
- Content of gravel—15 to 25 percent
- Content of cobbles—0 to 10 percent

Bw horizon:
- Value—5 or 6 dry, 3 or 4 moist
- Chroma—3 or 4 dry or moist
- Texture—very gravelly ashy sandy loam, very cobbly ashy sandy loam, or very gravelly ashy loam
- Content of gravel—25 to 50 percent
- Content of cobbles—5 to 15 percent

2Bw horizon:
- Value—5 or 6 dry, 3 or 4 moist
- Chroma—3 or 4 dry or moist
- Texture—very gravelly sandy loam, very cobbly sandy loam, or very gravelly loam
- Content of gravel—25 to 50 percent
- Content of cobbles—5 to 15 percent

Thow Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and footslopes
Parent material: Volcanic ash and pumice
Slope: 15 to 35 percent
Elevation: 2,700 to 5,200 feet
Mean annual precipitation: 20 to 25 inches
Mean annual air temperature: 40 to 45 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Ashy, glassy, frigid Typic Vitrixerands

Typical Pedon

Thow ashy loamy fine sand, in an area of Thow-Vingulch complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 8 miles southwest of Methow, Washington; 80 feet east and 30 feet south of the northwest corner of sec. 3, T. 29 N., R. 22 E.; latitude 48 degrees 2 minutes 50 seconds north and longitude 120 degrees 4 minutes 15 seconds west.

Oi—1 inch to 0; slightly decomposed forest litter; abrupt smooth boundary.
C—0 to 5 inches; white (10YR 8/1) ashy loamy fine sand, grayish brown (10YR 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common very fine and fine irregular pores; 5 percent pumice paragravel; slightly acid; clear wavy boundary.
2A—5 to 11 inches; light brownish gray (10YR 6/2) ashy sandy loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many

very fine and fine irregular pores; 10 percent pumice paragravel; slightly acid; gradual wavy boundary.

2Bw1—11 to 37 inches; light brownish gray (10YR 6/2) paragravelly ashy coarse sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; common fine irregular pores; 20 percent pumice paragravel; slightly acid; gradual wavy boundary.

2Bw2—37 to 50 inches; light gray (10YR 7/2) paragravelly ashy loamy coarse sand, brown (10YR 5/3) moist; very weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; common fine irregular pores; 25 percent pumice paragravel; neutral; gradual wavy boundary.

2Bw3—50 to 60 inches; light gray (10YR 7/2) paragravelly ashy loamy sand, brown (10YR 5/3) moist; very weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; common fine irregular pores; 25 percent pumice paragravel; neutral.

Range in Characteristics

Thickness of the material influenced by volcanic ash: Throughout the profile

C horizon:

Value—6 to 8 dry, 4 to 6 moist
Chroma—1 to 3 dry or moist
Content of pumice paragravel—0 to 10 percent

2A horizon:

Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—ashy sandy loam or ashy coarse sandy loam; paragravelly in some pedons
Content of pumice paragravel—5 to 25 percent

2Bw horizon:

Value—5 to 7 dry, 4 or 5 moist
Chroma—2 to 4 dry or moist
Texture—ashy coarse sandy loam, ashy loamy sand, ashy loamy coarse sand, or ashy sandy loam; paragravelly in some pedons
Content of pumice paragravel—5 to 30 percent

Thowson Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Footslopes and lower backslopes
Parent material: Volcanic ash and pumice
Slope: 15 to 35 percent
Elevation: 2,200 to 3,400 feet
Mean annual precipitation: 14 to 18 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 100 to 130 days
Taxonomic classification: Ashy, glassy, mesic Typic Vitrixerands

Typical Pedon

Thowson ashy coarse sandy loam, in an area of Thowson ashy coarse sandy loam, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 5 miles southwest of Methow, Washington; about 2,000 feet south and 1,900 feet east of

the northwest corner of sec. 34, T. 30 N., R. 22 E.; latitude 48 degrees 3 minutes 26 seconds north and longitude 120 degrees 4 minutes 12 seconds west.

Oi—1 inch to 0; slightly decomposed forest litter; abrupt smooth boundary.
A—0 to 7 inches; pale brown (10YR 6/3) ashy coarse sandy loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common very fine and fine irregular pores; 10 percent pumice paragravel; slightly acid; gradual wavy boundary.
Bw1—7 to 21 inches; light brownish gray (10YR 6/2) paragravelly ashy coarse sandy loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common very fine and fine irregular pores; 15 percent pumice paragravel; slightly acid; gradual wavy boundary.
Bw2—21 to 33 inches; light brownish gray (10YR 6/2) paragravelly ashy coarse sandy loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common very fine and fine irregular pores; 20 percent pumice paragravel; slightly acid; gradual wavy boundary.
Bw3—33 to 42 inches; light brownish gray (10YR 6/2) paragravelly ashy coarse sandy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; common very fine and fine irregular pores; 20 percent pumice paragravel; slightly acid; gradual wavy boundary.
2Bw4—42 to 60 inches; very pale brown (10YR 7/3) gravelly ashy coarse sandy loam, brown (10YR 5/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine, fine, and medium roots; common very fine and fine irregular pores; 20 percent gravel and 5 percent cobbles; slightly acid.

Range in Characteristics

Thickness of the material influenced by volcanic ash: Throughout the profile

A horizon:
- Value—5 to 7 dry, 3 or 4 moist
- Chroma—2 or 3 dry or moist
- Content of pumice paragravel—0 to 15 percent

Bw horizon:
- Value—5 to 7 dry, 4 or 5 moist
- Chroma—2 or 3 dry or moist
- Texture—ashy coarse sandy loam or ashy sandy loam; paragravelly in some pedons
- Content of pumice paragravel—5 to 30 percent

2Bw horizon:
- Value—6 or 7 dry, 4 or 5 moist
- Chroma—2 or 3 dry or moist
- Texture—ashy coarse sandy loam or ashy sandy loam or the gravelly analogs of those textures
- Content of gravel—0 to 20 percent
- Content of cobbles—0 to 5 percent

Thrapp Series

Soil depth: Moderately deep or deep
Drainage class: Moderately well drained

Landscape: Mountains
Position on landscape: Toeslopes and drainage sideslopes
Parent material: Mixed volcanic ash (10 to 15 inches) over glacial till
Slope: 5 to 35 percent
Elevation: 2,000 to 3,800 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 100 to 130 days
Taxonomic classification: Coarse-loamy, isotic, frigid Vitrandic Haploxerolls

Typical Pedon

Thrapp ashy loam, in an area of Thrapp-Aquandic Xerofluvents complex, 0 to 35 percent slopes; Okanogan National Forest Area, Washington; about 8 miles southeast of Twisp, Washington; 2,100 feet east and 700 feet south of the northwest corner of sec. 18, T. 32 N., R. 23 E.; latitude 48 degrees 17 minutes 15 seconds north and longitude 120 degrees 0 minutes 13 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, twigs, and leaves; abrupt smooth boundary.
A1—0 to 4 inches; very dark grayish brown (10YR 3/2) ashy loam, very dark brown (10YR 2/2) moist; weak fine and medium subangular blocky structure parting to moderate fine granular; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine tubular pores; neutral; clear wavy boundary.
A2—4 to 12 inches; very dark grayish brown (10YR 3/2) ashy loam, very dark brown (10YR 2/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine tubular pores; neutral; clear smooth boundary.
2Bw—12 to 22 inches; light brownish gray (10YR 6/2) sandy loam, grayish brown (10YR 5/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common fine irregular pores; 5 percent gravel; slightly acid; clear wavy boundary.
2C1—22 to 29 inches; very pale brown (10YR 7/3) gravelly sandy loam, pale brown (10YR 6/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; common very fine and fine irregular pores; 15 percent gravel; slightly acid; gradual wavy boundary.
2C2—29 to 36 inches; very pale brown (10YR 7/3) gravelly sandy loam, pale brown (10YR 6/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; common very fine and fine irregular pores; 20 percent gravel; slightly acid; clear smooth boundary.
2Cd—36 to 60 inches; white (10YR 8/2) gravelly sandy loam, light gray (10YR 7/2) moist; 30 percent fine and medium distinct yellowish brown (10YR 5/6, moist) irregular redoximorphic concentrations in the upper part; massive; hard, friable, slightly sticky and nonplastic; few very fine roots; 20 percent gravel; slightly acid.

Range in Characteristics

Depth to densic material: 35 to 45 inches
Thickness of the material influenced by mixed volcanic ash: 10 to 15 inches
Content of rock fragments in the particle-size control section: 15 to 30 percent
Thickness of the mollic epipedon: 10 to 15 inches
Depth to redoximorphic concentrations: 35 to 45 inches
Seasonal high water table: Present in spring

A horizon:
Value—3 or 4 dry, 2 or 3 moist
Content of gravel—0 to 10 percent

2Bw horizon:
Value—5 or 6 dry, 4 or 5 moist,
Chroma—2 or 3 dry or moist
Texture—sandy loam or gravelly sandy loam
Content of gravel—0 to 20 percent

2C horizon:
Value—6 or 7 dry, 5 or 6 moist
Chroma—2 or 3 dry or moist
Texture—gravelly sandy loam or gravelly coarse sandy loam
Content of gravel—15 to 30 percent

2Cd horizon:
Value—6 to 8 dry, 6 or 7 moist
Texture—dominantly gravelly sandy loam or gravelly coarse sandy loam; gravelly loamy sand below 45 inches in some pedons
Content of gravel—15 to 30 percent

Thuso Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Foothills and mountains
Position on landscape: Backslopes
Parent material: Mixed volcanic ash (10 to 25 inches) over colluvium from metasedimentary rock
Slope: 35 to 65 percent
Elevation: 2,200 to 3,700 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 130 days
Taxonomic classification: Loamy-skeletal, mixed, superactive, mesic Vitrandic Haploxerolls

Typical Pedon

Thuso ashy sandy loam, in an area of Thuso-Lithic Haploxerepts-Rock outcrop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 3 miles northeast of Conconully, Washington; 600 feet west and 1,800 feet south of the northeast corner of sec. 28, T. 36 N., R. 20 E.; latitude 48 degrees 35 minutes 36 seconds north and longitude 119 degrees 41 minutes 28 seconds west.

A1—0 to 12 inches; dark brown (10YR 4/3) ashy sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular structure; soft, friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine irregular pores; 10 percent gravel; neutral; gradual smooth boundary.
A2—12 to 25 inches; dark brown (10YR 4/3) gravelly ashy sandy loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine irregular pores; 25 percent gravel and 5 percent cobbles; neutral; gradual smooth boundary.
2Bw—25 to 37 inches; brown (10YR 5/3) very cobbly sandy loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; many very fine and common fine roots; many irregular pores; 25 percent gravel and 20 percent cobbles; neutral; gradual wavy boundary.
2C—37 to 60 inches; olive brown (2.5Y 4/4) very cobbly sandy loam, olive brown (2.5Y 4/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; common very

fine and few fine roots; common very fine and fine irregular pores; 30 percent gravel and 20 percent cobbles; neutral.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 10 to 25 inches
Content of rock fragments in the particle-size control section: 35 to 50 percent
Thickness of the mollic epipedon: 15 to 25 inches

A1 horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—1 to 3 dry or moist
Texture—ashy sandy loam, cobbly ashy sandy loam, or ashy loam
Content of gravel—5 to 10 percent
Content of cobbles—0 to 10 percent

A2 horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—1 to 3 dry or moist
Texture—gravelly or very gravelly ashy sandy loam
Content of gravel—20 to 40 percent
Content of cobbles—0 to 10 percent

2Bw horizon:
Value—4 to 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Texture—very cobbly or very gravelly sandy loam
Content of gravel—20 to 40 percent
Content of cobbles—5 to 20 percent

2C horizon:
Value—4 to 6 dry, 3 to 5 moist
Chroma—3 or 4 dry or moist
Texture—very cobbly or very gravelly sandy loam
Content of gravel—25 to 45 percent
Content of cobbles—10 to 30 percent

Toats Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, generally on southerly aspects
Parent material: Mixed volcanic ash (12 to 14 inches) over glacial till from granitic and metamorphic rock
Slope: 15 to 35 percent
Elevation: 4,600 to 5,500 feet
Mean annual precipitation: 25 to 30 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Loamy-skeletal, mixed, superactive Vitrandic Dystrocryepts

Typical Pedon

Toats ashy loam, in an area of Toats-Longswamp complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 2,400 feet west and 1,800 feet south of northeast corner of sec. 20, T. 29 N., R. 24 E.; latitude 48 degrees 52 minutes 0 seconds north and longitude 119 degrees 51 minutes 9 seconds west.

A1—0 to 5 inches; very dark grayish brown (10YR 3/2) ashy loam, black (10YR 2/1) moist; strong fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common very fine and fine pores; 10 percent gravel; neutral; gradual wavy boundary.

A2—5 to 14 inches; very dark grayish brown (10YR 3/2) ashy loam, black (10YR 2/1) moist; moderate fine subangular blocky structure parting to moderate fine granular; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common very fine and fine pores; 10 percent gravel; neutral; gradual wavy boundary.

2Bw—14 to 23 inches; dark grayish brown (10YR 4/2) very cobbly loam, black (10YR 2/1) moist; moderate fine and medium subangular blocky structure parting to moderate medium granular; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine pores; 20 percent gravel, 20 percent cobbles, and 5 percent stones; neutral; clear wavy boundary.

2C1—23 to 40 inches; light yellowish brown (2.5Y 6/3) very stony sandy loam, olive brown (2.5Y 4/2) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; common very fine and fine roots; common very fine and fine pores; 15 percent gravel, 25 percent cobbles, and 15 percent stones; neutral; gradual wavy boundary.

2C2—40 to 52 inches; light olive brown (2.5Y 5/3) very stony sandy loam, olive brown (2.5Y 4/3) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; few very fine and fine roots; few very fine pores; 15 percent gravel, 20 percent cobbles, and 25 percent stones; neutral; gradual wavy boundary.

2C3—52 to 60 inches; light yellowish brown (2.5Y 6/3) very stony sandy loam, light olive brown (2.5Y 5/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine pores; 15 percent gravel, 15 percent cobbles, and 30 percent stones; neutral.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 12 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 65 percent
Thickness of the umbric epipedon: 20 to 25 inches
Soil moisture regime: Xeric

A horizon:
- Value—3 or 4 dry, 2 or 3 moist
- Chroma—1 or 2 dry or moist
- Content of gravel—0 to 15 percent

2Bw horizon:
- Value—3 or 4 dry, 2 or 3 moist
- Chroma—1 or 2 dry or moist
- Texture—very cobbly loam, very gravelly sandy loam, or gravelly loam
- Content of gravel—15 to 25 percent
- Content of cobbles—0 to 20 percent
- Content of stones—0 to 5 percent

2C horizon:
- Hue—10YR or 2.5Y
- Value—5 or 6 dry, 4 or 5 moist
- Chroma—2 or 3 dry or moist
- Texture—very stony or very cobbly sandy loam
- Content of gravel—15 to 30 percent
- Content of cobbles—15 to 25 percent
- Content of stones—0 to 25 percent

Togo Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, footslopes, and ridges
Parent material: Volcanic ash (14 to 20 inches) over residuum, colluvium, and glacial till from granitic rock
Slope: 15 to 65 percent
Elevation: 2,500 to 6,500 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 37 to 39 degrees F
Frost-free period: 70 to 100 days
Taxonomic classification: Ashy over loamy-skeletal, glassy over isotic Xeric Vitricryands

Typical Pedon

Togo ashy loam; North Ferry Area, Washington; about 1.9 miles up Twin Sisters Lookout Road from Mack Mountain Road Junction; SE¼SE¼NW¼ sec. 17, T. 37 N., R. 35 E.; latitude 48 degrees 42 minutes 14 seconds north and longitude 118 degrees 24 minutes 13 seconds west.

Oi—2 inches to 1 inch; slightly decomposed leaves, needles, and twigs.
Oe—1 inch to 0; moderately decomposed leaves, needles, and twigs.
A—0 to 1.5 inches; light gray (10YR 7/1) ashy loam, gray (10YR 5/1) moist; common fine distinct redoximorphic concentrations, dark brown (7.5YR 3/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; common fine and medium roots; few fine tubular pores; 5 percent gravel and 5 percent angular cobbles; few fine charcoal fragments; neutral; abrupt wavy boundary.
Bw1—1.5 to 9 inches; very pale brown (10YR 7/4) gravelly ashy loam, brown (7.5YR 4/4) moist; weak fine and medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; common fine and medium roots; few fine tubular pores; 10 percent gravel and 5 percent angular cobbles; neutral; clear wavy boundary.
Bw2—9 to 18 inches; light yellowish brown (10YR 6/4) gravelly ashy loam, brown (7.5YR 4/4 and 10YR 5/3) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; common fine and medium roots; few fine pores; 20 percent gravel and 5 percent angular cobbles; neutral; clear irregular boundary.
2C1—18 to 34 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 5/3) moist; 40 percent brown (7.5YR 4/4, moist) vertical extensions from the Bw2 horizon; massive; hard, very friable, nonsticky and nonplastic; common fine and medium roots; few fine tubular pores; 40 percent gravel and cobbles; moderately acid; gradual irregular boundary.
2C2—34 to 60 inches; pale brown (10YR 6/3) extremely gravelly sandy loam, brown (10YR 5/3) moist; 20 percent brown (7.5YR 4/4, moist) vertical extensions from the Bw2 horizon; massive; hard, very friable, nonsticky and nonplastic; few medium roots; 80 percent gravel and cobbles; moderately acid.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 14 to 20 inches
Rock fragments: 5 to 25 percent in the ashy layer and 35 to 80 percent in the lower part of the particle-size control section

A horizon:
Hue—10YR or 7.5YR
Value—6 or 7 dry, 4 or 5 moist

Bw horizon:
- Hue—10YR or 7.5YR
- Value—5 to 7 dry, 4 or 5 moist
- Chroma—3 or 4 dry or moist
- Texture—ashy loam, gravelly ashy loam, or cobbly ashy loam
- Content of gravel—0 to 20 percent
- Content of cobbles—0 to 20 percent

2C horizon:
- Hue—10YR, 2.5Y, or 5Y
- Value—6 to 8 dry, 5 or 6 moist
- Chroma—2 to 4 dry or moist
- Texture—very gravelly, very cobbly, extremely gravelly, or extremely cobbly sandy loam
- Content of gravel—20 to 60 percent
- Content of cobbles—10 to 30 percent
- Content of stones—0 to 5 percent

Torboy Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Terraces and terrace escarpments
Parent material: Mixed volcanic ash (9 to 18 inches) over glacial outwash
Slope: 0 to 65 percent
Elevation: 3,000 to 5,000 feet
Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 40 to 45 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Sandy, isotic, frigid Vitrandic Haploxerepts

Typical Pedon

Torboy ashy sandy loam, in an area of Stepstone-Torboy complex, 0 to 15 percent slopes; Okanogan National Forest Area, Washington; about 2 miles east of Tunk Mountain; 350 feet east and 1,100 feet north of the southwest corner of sec. 10, T. 35 N., R. 29 E.; latitude 48 degrees 32 minutes 34 seconds north and longitude 119 degrees 11 minutes 33 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, twigs, and leaves; abrupt smooth boundary.

A—0 to 5 inches; light brownish gray (10YR 6/2) ashy sandy loam, dark grayish brown (10YR 4/2) moist; weak fine and medium platy structure parting to weak fine and medium subangular blocky; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; few fine tubular pores; slightly acid; clear wavy boundary.

Bw1—5 to 10 inches; pale brown (10YR 6/3) ashy sandy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; few fine tubular pores; slightly acid; clear wavy boundary.

Bw2—10 to 18 inches; pale brown (10YR 6/3) ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; few fine tubular pores; slightly acid; clear wavy boundary.

2C1—18 to 27 inches; light yellowish brown (2.5Y 6/3) loamy sand, olive brown (2.5Y 4/3) moist; single grain; loose, nonsticky and nonplastic; few very fine, fine, and medium roots; common medium distinct dark yellowish brown (10YR 4/4, moist) stains; 5 percent gravel; slightly acid; gradual wavy boundary.
2C2—27 to 37 inches; light yellowish brown (2.5Y 6/3) loamy sand, brown (2.5Y 5/3) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; 5 percent gravel; slightly acid; gradual wavy boundary.
2C3—37 to 60 inches; light brownish gray (2.5Y 6/2) gravelly loamy sand, grayish brown (2.5Y 5/2) moist; single grain; loose, nonsticky and nonplastic; 15 percent gravel; neutral.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 9 to 18 inches
Content of rock fragments in the particle-size control section: 10 to 35 percent
Note: Some pedons have a thin layer of volcanic ash directly below the organic layer. The layer consists of 140 to 190 year old “T” and/or 450 to 500 year old “W” ash from Mount Saint Helens.

A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—ashy sandy loam or cobbly ashy sandy loam
Content of gravel—0 to 10 percent
Content of cobbles—0 to 15 percent

Bw horizon:
Value—5 or 6 dry, 3 to 5 moist
Chroma—2 to 4 dry or moist
Texture—ashy sandy loam or gravelly ashy sandy loam
Content of gravel—0 to 20 percent

2C horizon:
Hue—10YR or 2.5Y
Value—5 or 6 dry, 4 or 5 moist
Chroma—1 to 3 dry or moist
Texture—gravelly loamy sand, loamy sand, or gravelly sand
Content of gravel—5 to 35 percent

Treebutte Series

Soil depth: Shallow
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Shoulders and broad ridges
Parent material: Volcanic ash (7 to 10 inches) over residuum and colluvium from granitic and metamorphic rock
Slope: 0 to 65 percent
Elevation: 4,800 to 7,200 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 25 to 40 degrees F
Frost-free period: 60 to 85 days
Taxonomic classification: Loamy-skeletal, isotic Lithic Eutrocryepts

Typical Pedon

Treebutte very stony ashy sandy loam, in an area of Devore-Treebutte complex, 0 to 15 percent slopes; Okanogan National Forest Area, Washington; about 14 miles

northwest of Conconully, Washington; 2,300 feet east and 1,300 feet north of the southwest corner of sec. 9, T. 37 N., R. 23 E.; latitude 48 degrees 43 minutes 2 seconds north and longitude 119 degrees 57 minutes 39 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.
A—0 to 1 inch; grayish brown (10YR 5/2) very stony ashy sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; common fine and medium tubular pores; 20 percent gravel, 5 percent cobbles, and 20 percent stones; slightly acid; clear wavy boundary.
Bw—1 to 10 inches; pale brown (10YR 6/3) very stony ashy sandy loam, dark yellowish brown (10YR 4/6) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and very fine roots; common fine tubular pores; 20 percent gravel, 10 percent cobbles, and 15 percent stones; moderately acid; abrupt wavy boundary.
2C—10 to 19 inches; very pale brown (10YR 7/3) extremely stony coarse sandy loam, pale brown (10YR 6/3) moist; massive; soft, very friable, nonsticky and nonplastic; common fine and very fine roots; common fine and medium tubular pores; 30 percent gravel, 15 percent cobbles, and 25 percent stones; moderately acid; gradual wavy boundary.
2R—19 inches; granite.

Range in Characteristics

Depth to bedrock: 14 to 20 inches
Thickness of the material influenced by volcanic ash: 7 to 10 inches
Content of rock fragments in the particle-size control section: 60 to 75 percent
Soil moisture regime: Xeric

A horizon:
Value—4 or 5 dry
Chroma—2 or 3 dry or moist
Content of gravel—10 to 25 percent
Content of cobbles—5 to 20 percent
Content of stones—15 to 25 percent

Bw horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—3 to 6 dry or moist
Content of gravel—10 to 20 percent
Content of cobbles—10 to 25 percent
Content of stones—15 to 25 percent

2C horizon:
Value—6 or 7 dry, 4 to 6 moist
Chroma—3 to 6 dry or moist
Texture—extremely stony coarse sandy loam, extremely stony sandy loam, or very stony sandy loam
Content of gravel—20 to 30 percent
Content of cobbles—15 to 25 percent
Content of stones—25 to 35 percent

Twentymile Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains

Position on landscape: Backslopes, footslopes, and toeslopes, generally on northerly aspects
Parent material: Volcanic ash (7 to 14 inches) over glacial till
Slope: 15 to 35 percent
Elevation: 4,800 to 6,800 feet
Mean annual precipitation: 35 to 40 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days
Taxonomic classification: Loamy-skeletal, isotic Andic Dystrocryepts

Typical Pedon

Twentymile stony ashy fine sandy loam, in an area of Smokejump-Twentymile complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 3.5 miles southwest of Thunder Mountain; 2,300 feet east and 2,100 feet north of the southwest corner of sec. 10, T. 37 N., R. 23 E.; latitude 48 degrees 43 minutes 6 seconds north and longitude 119 degrees 56 minutes 19 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.
C—0 to 1 inch; white (10YR 8/1) ashy silt loam, grayish brown (10YR 5/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine roots; common very fine and fine pores; 5 percent gravel; moderately acid; clear wavy boundary.
2A—1 to 4 inches; pale brown (10YR 6/3) stony ashy fine sandy loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine and common medium and coarse roots; common very fine and fine pores; 5 percent gravel, 5 percent cobbles, and 5 percent stones; moderately acid; clear smooth boundary.
2Bw—4 to 13 inches; light yellowish brown (10YR 6/4) gravelly ashy fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium and coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine and few medium and coarse roots; common very fine and fine pores; 15 percent gravel; slightly acid; clear smooth boundary.
3CB—13 to 31 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, grayish brown (10YR 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine and few medium roots; common very fine and fine irregular pores; 35 percent gravel and 5 percent cobbles; slightly acid; gradual wavy boundary.
3Cd1—31 to 44 inches; light gray (2.5Y 7/2) very gravelly sandy loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine roots; few fine irregular pores; 35 percent gravel and 5 percent cobbles; slightly acid; gradual wavy boundary.
3Cd2—44 to 60 inches; light brownish gray (2.5Y 6/2) very gravelly sandy loam, grayish brown (2.5Y 5/2) moist; massive; hard, firm, slightly sticky and slightly plastic; common thin olive brown (2.5Y 4/3, moist) stains; 30 percent gravel and 5 percent cobbles; slightly acid.

Range in Characteristics

Depth to densic material: 20 to 35 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent
Soil moisture regime: Udic
Note: Not all pedons have a C horizon.

C horizon (where present):
Value—7 or 8 dry, 5 or 6 moist
Chroma—1 or 2 dry
Content of gravel—0 to 10 percent

2A horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Texture—ashy fine sandy loam or stony ashy fine sandy loam
Content of gravel—0 to 10 percent
Content of cobbles—0 to 5 percent
Content of stones—0 to 15 percent

2Bw horizon:
Chroma—3 or 4 dry or moist
Texture—ashy fine sandy loam, gravelly ashy fine sandy loam, or stony ashy fine sandy loam
Content of gravel—5 to 20 percent
Content of cobbles—0 to 5 percent
Content of stones—0 to 15 percent

3CB horizon:
Hue—2.5Y or 10YR
Value—6 or 7 dry
Chroma—2 or 3 dry or moist
Texture—very gravelly, very cobbly, or very stony sandy loam
Content of gravel—25 to 40 percent
Content of cobbles—0 to 25 percent
Content of stones—0 to 20 percent

3Cd horizon:
Hue—2.5Y or 5Y
Value—6 or 7 dry
Chroma—2 or 3 dry or moist
Texture—very gravelly, very cobbly, or very stony sandy loam
Content of gravel—25 to 40 percent
Content of cobbles—3 to 25 percent
Content of stones—0 to 20 percent

Typic Udivitrands

Soil depth: Moderately deep to very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, shoulders, and glacial-trough valleys
Parent material: Volcanic ash (14 to 25 inches) over residuum, colluvium, and glacial till
Slope: 35 to 90 percent
Elevation: 2,100 to 5,000 feet
Mean annual precipitation: 50 to 70 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 85 to 120 days
Taxonomic classification: Typic Udivitrands

Reference Pedon

Typic Udivitrands, in an area of Typic Udivitrands-Andic Dystrudepts association, 65 to 90 percent slopes; Okanogan National Forest Area, Washington; about 3 miles

southeast of Crater Mountain; 2,000 feet east and 900 feet south of the northwest corner of sec. 16, T. 37 N., R. 16 E.; latitude 48 degrees 42 minutes 44 seconds north and longitude 120 degrees 52 minutes 47 seconds west.

Oe—3 inches to 0; moderately decomposed mat of needles, twigs, and leaves; abrupt smooth boundary.

C—0 to 1 inch; light gray (10YR 7/1) ashy sandy loam, grayish brown (10YR 5/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; few very fine tubular pores; 5 percent gravel; moderately acid; abrupt irregular boundary.

2A—1 to 7 inches; light yellowish brown (10YR 6/4) gravelly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium and coarse roots; few very fine irregular pores; 20 percent gravel; moderately acid; clear wavy boundary.

2Bw—7 to 21 inches; brownish yellow (10YR 6/6) gravelly ashy sandy loam, dark yellowish brown (10YR 4/6) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium and coarse roots; few fine irregular pores; 30 percent gravel; moderately acid; clear wavy boundary.

3C1—21 to 36 inches; light yellowish brown (2.5Y 6/4) very gravelly sandy loam, olive brown (2.5Y 4/4) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; few fine irregular pores; 40 percent gravel and 5 percent cobbles; slightly acid; gradual wavy boundary.

3C2—36 to 60 inches; light yellowish brown (2.5Y 6/3) very gravelly sandy loam, olive brown (2.5Y 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; few very fine irregular pores; 45 percent gravel and 5 percent cobbles; slightly acid.

Range in Characteristics

Depth to bedrock or densic material: 20 to more than 60 inches

Thickness of the material influenced by volcanic ash: 14 to 25 inches

Rock fragments: 5 to 45 percent in the ashy layer and 40 to 75 percent in the lower part of the particle-size control section

Note: Not all pedons have a C horizon.

C horizon (where present):

Value—6 to 8 dry, 4 or 5 moist
Chroma—1 or 2 dry or moist

2A horizon:

Chroma—4 to 6 dry or moist
Content of gravel—5 to 20 percent
Content of cobbles—0 to 5 percent

2Bw horizon:

Hue—7.5YR or 10YR
Chroma—4 to 6 dry or moist
Texture—gravelly ashy sandy loam, very gravelly ashy sandy loam, or ashy sandy loam
Content of gravel—5 to 35 percent
Content of cobbles—0 to 10 percent

3C horizon:

Hue—10YR or 2.5Y
Value—5 to 7 dry, 4 to 6 moist

Chroma—2 to 4 dry or moist
Texture—very gravelly, very cobbly, or extremely gravelly sandy loam
Content of gravel—35 to 50 percent
Content of cobbles—5 to 25 percent

Typic Vitricryands

Soil depth: Moderately deep to very deep
Drainage class: Well drained or somewhat excessively drained
Landscape: Mountains
Position on landscape: Backslopes, footslopes, and shoulders of glacial-trough valleys
Parent material: Volcanic ash (14 to 50 inches) over residuum, colluvium, and glacial till
Slope: 5 to 90 percent
Elevation: 4,000 to 8,000 feet
Mean annual precipitation: 40 to 90 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days
Taxonomic classification: Typic Vitricryands

Reference Pedon

Typic Vitricryands, in an area of Andic Haplocryods-Typic Vitricryands association, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 1.5 miles north-northwest of Holliway Mountain; 1,400 feet west and 1,500 feet north of the southeast corner of sec. 9, T. 36 N., R. 17 E.; latitude 48 degrees 37 minutes 52 seconds north and longitude 120 degrees 44 minutes 17 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles, twigs, and leaves; abrupt smooth boundary.
C—0 to 1 inch; white (10YR 8/1) ashy fine sandy loam, gray (10YR 6/1) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; few very fine pores; moderately acid; clear irregular boundary.
2A—1 to 7 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; moderately smeary; many very fine and fine and few medium and coarse roots; few very fine irregular pores; 15 percent gravel; slightly acid; clear wavy boundary.
2Bw—7 to 18 inches; brownish yellow (10YR 6/6) gravelly ashy sandy loam, dark yellowish brown (10YR 4/6) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; moderately smeary; many very fine and fine and few medium and coarse roots; few very fine irregular pores; 25 percent gravel; slightly acid; clear wavy boundary.
3BC—18 to 26 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, grayish brown (10YR 5/2) moist; weak fine subangular blocky structure; soft, friable, nonsticky and nonplastic; common very fine and fine and few medium roots; few fine and very fine pores; 35 percent gravel and 10 percent cobbles; slightly acid; clear wavy boundary.
3C—26 to 48 inches; light gray (10YR 7/2) very gravelly sandy loam, grayish brown (10YR 5/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine roots; few very fine pores; 40 percent gravel and 10 percent cobbles; slightly acid.
3R—48 inches; sandstone.

Range in Characteristics

Depth to bedrock or densic material: 20 to more than 60 inches
Thickness of the material influenced by volcanic ash: 14 to 50 inches

Rock fragments: 10 to 50 percent in the ashy layer and 20 to 65 percent in the till, colluvium, or residuum
Note: Not all pedons have a C horizon.

C horizon (where present):
Value—7 or 8 dry, 5 to 7 moist
Chroma—1 or 2 dry or moist
Texture—ashy fine sandy loam, ashy silt loam, or ashy very fine sandy loam

2A and 2Bw horizons:
Hue—7.5YR or 10YR
Value—4 to 6 dry, 3 or 4 moist
Chroma—3 to 6 dry or moist
Texture—gravelly ashy sandy loam, ashy sandy loam, or very gravelly ashy sandy loam
Content of gravel—10 to 40 percent
Content of cobbles—0 to 10 percent

3BC and 3C horizons:
Hue—10YR or 2.5Y
Value—5 to 7 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly or gravelly sandy loam
Content of gravel—15 to 45 percent
Content of cobbles—5 to 20 percent

Typic Vitrixerands

Soil depth: Moderately deep to very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and shoulders
Parent material: Volcanic ash (14 to 24 inches) over glacial till, colluvium, and residuum
Slope: 35 to 75 percent
Elevation: 2,900 to 5,000 feet
Mean annual precipitation: 20 to 25 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 85 to 120 days
Taxonomic classification: Typic Vitrixerands

Reference Pedon

Typic Vitrixerands, in an area of Typic Vitrixerands-Andic Haploxerepts-Rock outcrop association, 35 to 75 percent slopes; Okanogan National Forest Area, Washington; about 1 mile northwest of Driveway Butte; 400 feet east and 700 feet north of the southwest corner of sec. 1, T. 36 N., R. 19 E.; latitude 48 degrees 38 minutes 44 seconds north and longitude 120 degrees 33 minutes 18 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles, twigs, and leaves.
C—0 to 1 inch; light gray (10YR 7/2) ashy sandy loam, light brownish gray (10YR 6/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few coarse roots; common fine and very fine tubular pores; slightly acid; clear wavy boundary.
2A—1 to 5 inches; light brownish gray (10YR 6/2) gravelly ashy sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine and few medium roots; few fine irregular pores; 15 percent gravel; slightly acid; clear smooth boundary.

2Bw1—5 to 10 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine and few medium roots; common fine irregular pores; 20 percent gravel; slightly acid; clear wavy boundary.
2Bw2—10 to 22 inches; light yellowish brown (10YR 6/4) very gravelly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine and few medium roots; common fine irregular pores; 30 percent gravel and 5 percent cobbles; slightly acid; abrupt wavy boundary.
3BC—22 to 32 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 5/3) moist; weak fine and medium subangular blocky structure; very friable, nonsticky and nonplastic; few very fine and fine roots; few fine irregular pores; 30 percent gravel, 10 percent cobbles, and 5 percent stones; slightly acid; gradual wavy boundary.
3R—32 inches; shale.

Range in Characteristics

Depth to bedrock or densic material: 20 to more than 60 inches
Thickness of the material influenced by volcanic ash: 14 to 24 inches
Rock fragments: 15 to 35 percent in the ashy layer and 20 to 65 percent in the till, colluvium, or residuum
Note: Not all pedons have a C horizon.

C horizon (where present):
Value—6 to 8 dry, 5 to 7 moist
Chroma—1 or 2 dry or moist

2A horizon:
Value—5 to 7 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Content of gravel—15 to 25 percent
Content of cobbles—0 to 5 percent

2Bw horizon:
Value—3 or 4 moist
Chroma—3 or 4 dry or moist
Texture—gravelly or very gravelly ashy sandy loam
Content of gravel—15 to 35 percent
Content of cobbles—0 to 5 percent

3BC horizon:
Hue—2.5Y or 10YR
Value—6 or 7 dry, 4 to 6 moist
Chroma—2 to 4 dry or moist
Texture—gravelly, very gravelly, very cobbly, or extremely gravelly sandy loam
Content of gravel—20 to 50 percent
Content of cobbles—5 to 20 percent
Content of stones—0 to 5 percent

Vallan Series

Soil depth: Very shallow and shallow
Drainage class: Well drained
Landscape: Foothills and mountains
Position on landscape: Summits, shoulders, and backslopes

Parent material: Mixed volcanic ash (1 to 3 inches) over colluvium and residuum from rhyodactite and andesite
Slope: 15 to 50 percent
Elevation: 3,000 to 5,500 feet
Mean annual precipitation: 15 to 25 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 70 to 120 days
Taxonomic classification: Loamy, mixed, superactive, frigid Lithic Haploxerepts

Typical Pedon

Vallan ashy loam, in grassland; North Ferry Area, Washington, soil survey area; about 500 feet east and 400 feet south of the northwest corner of SW¼NE¼ sec. 26, T. 37 N., R. 32 E.; latitude 48 degrees 40 minutes 40 seconds north and longitude 118 degrees 43 minutes 57 seconds west.

A—0 to 2 inches; brown (10YR 5/3) ashy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many roots; neutral; abrupt smooth boundary.
2Bw—2 to 10 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 3/4) moist; moderate fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; many roots; slightly acid; clear smooth boundary.
2Bt—10 to 16 inches; brown (10YR 5/4) gravelly loam, dark brown (7.5YR 3/4) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common roots; common fine and medium pores; thin to moderately thick clay films in pores and on peds; 15 percent angular and rounded pebbles and stones; slightly acid; abrupt wavy boundary.
2R—16 inches; slightly weathered andesite bedrock.

Range in Characteristics

Depth to bedrock: 6 to 20 inches
Thickness of the material influenced by mixed volcanic ash: 1 to 3 inches
Content of rock fragments in the particle-size control section: 5 to 25 percent

A horizon:
Hue—7.5YR or 10YR
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3 moist or dry

2Bw and 2Bt horizons:
Hue—7.5YR or 10YR
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Texture—gravelly loam or loam
Content of rock fragments—0 to 25 percent

Vanbrunt Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Shoulders, ridges, and backslopes, generally on southerly aspects
Parent material: Mixed volcanic ash (7 to 19 inches) over residuum and colluvium from granitic rock
Slope: 35 to 65 percent
Elevation: 2,200 to 4,600 feet

Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 100 to 130 days
Taxonomic classification: Loamy-skeletal, isotic, mesic Vitrandic Haploxerolls

Typical Pedon

Vanbrunt stony ashy sandy loam, in an area of Vanbrunt-Swakane-Rock outcrop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 7.5 miles northeast of Winthrop; 2,700 feet east and 1,100 feet south of the northwest corner of sec. 33, T. 36 N., R. 22 E.; latitude 48 degrees 34 minutes 51 seconds north and longitude 120 degrees 5 minutes 17 seconds west.

Oi—1 inch to 0; slightly decomposed mat of needles, twigs, and grass; abrupt smooth boundary.
A1—0 to 7 inches; grayish brown (10YR 5/2) stony ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; common fine irregular pores; 15 percent gravel, 5 percent cobbles, and 10 percent stones; slightly acid; clear smooth boundary.
A2—7 to 12 inches; brown (10YR 5/3) very cobbly ashy sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; common fine irregular pores; 20 percent gravel and 25 percent cobbles; slightly acid; clear wavy boundary.
Bw—12 to 19 inches; pale brown (10YR 6/3) very cobbly ashy sandy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine, fine, medium, and coarse roots; common fine irregular pores; 20 percent gravel, 30 percent cobbles, and 2 percent stones; slightly acid; clear wavy boundary.
2C—19 to 25 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; 20 percent gravel, 30 percent cobbles, and 5 percent stones; slightly acid; abrupt wavy boundary.
2R—25 inches; granite.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the mollic epipedon: 7 to 12 inches
Thickness of the material influenced by mixed volcanic ash: 7 to 19 inches
Content of rock fragments in the particle-size control section: 35 to 70 percent

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3 dry or moist
Content of gravel—10 to 20 percent
Content of cobbles—0 to 25 percent
Content of stones—0 to 15 percent

Bw horizon:
Value—5 or 6 dry, 3 to 4 moist
Chroma—2 or 3 dry or moist
Texture—very cobbly, very gravelly, or extremely cobbly ashy sandy loam
Content of gravel—20 to 35 percent
Content of cobbles—10 to 30 percent
Content of stones—0 to 5 percent

2C horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very cobbly, extremely gravelly, or extremely cobbly sandy loam
Content of gravel—20 to 40 percent
Content of cobbles—15 to 30 percent
Content of stones—0 to 10 percent

Venson Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and shoulders
Parent material: Volcanic ash (7 to 14 inches) over residuum and colluvium from sedimentary rock of the Ventura member of the Midnight Peak Formation
Slope: 35 to 65 percent
Elevation: 4,800 to 6,500 feet
Mean annual precipitation: 35 to 40 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Loamy-skeletal, isotic Andic Dystrocryepts

Typical Pedon

Venson gravelly ashy sandy loam, in an area of Venson gravelly ashy sandy loam, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 4 miles north of Mazama, Washington; 400 feet east and 1,300 feet north of the southwest corner of sec. 6, T. 37 N., R. 20 E.; latitude 48 degrees 38 minutes 49 seconds north and longitude 120 degrees 24 minutes 2 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.
A—0 to 4 inches; reddish brown (5YR 4/3) gravelly ashy sandy loam, dark reddish brown (5YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine and few medium roots; common very fine and fine irregular pores; 15 percent gravel; slightly acid; clear smooth boundary.
Bw—4 to 11 inches; reddish brown (5YR 4/4) gravelly ashy sandy loam, dark reddish brown (5YR 3/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common very fine and fine and few medium roots; common very fine and fine irregular pores; 20 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.
2C1—11 to 28 inches; reddish brown (2.5YR 5/3) very gravelly sandy loam, reddish brown (2.5YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; few fine irregular pores; 40 percent angular pebbles and 5 percent angular cobbles; slightly acid; clear wavy boundary.
2C2—28 to 38 inches; reddish brown (2.5YR 5/3) extremely gravelly sandy loam, reddish brown (2.5YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots in the upper part; 60 percent angular pebbles and 10 percent angular cobbles; slightly acid.
2R—38 inches; red sandstone.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches

Content of rock fragments in the particle-size control section: 40 to 70 percent
Soil moisture regime: Udic

A horizon:
Hue—5YR, 7.5YR, or 2.5YR
Value—4 or 5 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Content of gravel—15 to 20 percent
Content of cobbles—0 to 5 percent

Bw horizon:
Hue—5YR or 2.5YR
Value—4 to 6 dry, 3 or 4 moist
Chroma—3 or 4 dry or moist
Content of gravel—15 to 25 percent
Content of cobbles—0 to 5 percent

2C horizon:
Hue—5YR or 2.5YR
Value—4 or 5 dry, 3 or 4 moist
Chroma—2 to 4 dry or moist
Texture—very gravelly, extremely gravelly, or very cobbly sandy loam
Content of gravel—40 to 70 percent
Content of cobbles—5 to 20 percent

Verhart Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, shoulders, and ridges, generally on southerly aspects
Parent material: Mixed volcanic ash (7 to 14 inches) over residuum and colluvium from sedimentary rock
Slope: 15 to 65 percent
Elevation: 4,800 to 6,600 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Loamy-skeletal, isotic Vitrandic Eutrocryepts

Typical Pedon

Verhart stony ashy sandy loam, in an area of Verhart-Rock outcrop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 1,100 feet west and 800 feet north of the southeast corner of sec. 20, T. 37 N., R. 20 E.; latitude 48 degrees 41 minutes 19 seconds north and longitude 120 degrees 22 minutes 7 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.
A—0 to 4 inches; brown (10YR 5/3) stony ashy sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; common fine irregular pores; 10 percent gravel, 5 percent cobbles, and 5 percent stones; neutral; clear wavy boundary.

Bw—4 to 11 inches; pale brown (10YR 6/3) very gravelly ashy sandy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common very fine and fine irregular pores; 30 percent gravel and 5 percent cobbles; slightly acid; clear smooth boundary.
2C—11 to 24 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; few fine irregular pores; 40 percent gravel, 5 percent cobbles, and 5 percent stones; slightly acid; clear wavy boundary.
2R—24 inches; sandstone.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the material influenced by mixed volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 40 to 70 percent
Soil moisture regime: Xeric

A horizon:
Value—4 to 6 dry, 3 to 5 moist
Chroma—2 or 3 dry or moist
Texture—stony or gravelly ashy sandy loam
Content of gravel—5 to 15 percent
Content of cobbles—0 to 5 percent
Content of stones—0 to 15 percent

Bw horizon:
Value—3 or 4 moist
Texture—gravelly, very gravelly, or very cobbly ashy sandy loam
Content of gravel—25 to 40 percent
Content of cobbles—5 to 20 percent
Content of stones—0 to 5 percent

2C horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly, very cobbly, or extremely gravelly sandy loam
Content of gravel—35 to 45 percent
Content of cobbles—5 to 20 percent
Content of stones—0 to 5 percent

Veridge Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and shoulders
Parent material: Volcanic ash (7 to 14 inches) over residuum and colluvium from sedimentary rock
Slope: 35 to 65 percent
Elevation: 2,800 to 4,900 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 115 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Andic Haploxerepts

Typical Pedon

Veridge gravelly ashy sandy loam, in an area of Veridge-Farway complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 2 miles west-southwest of Mazama, Washington; about 1,900 feet west and 2,100 feet north of the southeast corner of sec. 35, T. 36 N., R. 19 E.; latitude 48 degrees 34 minutes 36 seconds north and longitude 120 degrees 26 minutes 12 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.

A—0 to 4 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and few medium and coarse roots; common very fine and fine pores; 15 percent gravel; slightly acid; clear smooth boundary.

Bw—4 to 12 inches; light yellowish brown (10YR 6/4) gravelly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and few medium and coarse roots; common very fine and fine pores; 15 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.

2CB—12 to 21 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 5/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; few very fine and fine pores; 30 percent gravel and 10 percent cobbles; neutral; gradual wavy boundary.

2C—21 to 30 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine, fine, and medium roots; few very fine pores; 20 percent gravel and 30 percent cobbles; neutral; gradual wavy boundary.

2R—30 inches; sandstone.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the material influenced by volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 55 percent

A horizon:

Value—3 or 4 moist
Chroma—3 or 4 dry or moist
Content of gravel—15 to 20 percent
Content of cobbles—0 to 5 percent

Bw horizon:

Value—3 or 4 moist
Chroma—3 or 4 moist
Texture—gravelly ashy sandy loam or ashy sandy loam
Content of gravel—5 to 20 percent
Content of cobbles—0 to 5 percent

2CB horizon:

Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—25 to 35 percent
Content of cobbles—5 to 20 percent

2C horizon:

Value—4 or 5 moist
Chroma—3 or 4 dry or moist

Content of gravel—20 to 35 percent
Content of cobbles—20 to 30 percent

Vinegar Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Footslopes and lower backslopes
Parent material: Volcanic ash and pumice
Slope: 0 to 35 percent
Elevation: 2,200 to 5,200 feet
Mean annual precipitation: 20 to 25 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Ashy, glassy, frigid Typic Vitrixerands

Typical Pedon

Vinegar ashy sandy loam, in an area of Vinegar-Thow complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 7 miles west of Methow, Washington; 70 feet west and 1,500 feet north of the southeast corner of sec. 12, T. 30 N., R. 21 E.; latitude 48 degrees 6 minutes 40 seconds north and longitude 120 degrees 8 minutes 32 seconds west.

Oi—1 inch to 0; slightly decomposed forest litter; abrupt smooth boundary.
A—0 to 5 inches; light brownish gray (10YR 6/2) ashy sandy loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; common very fine and fine irregular pores; 10 percent pumice paragravel; slightly acid (pH 6.5); gradual wavy boundary.
Bw1—5 to 15 inches; light brownish gray (10YR 6/2) ashy coarse sandy loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common very fine and fine irregular pores; 10 percent pumice paragravel; slightly acid (pH 6.5); gradual wavy boundary.
Bw2—15 to 33 inches; pale brown (10YR 6/3) paragravelly ashy coarse sandy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; common very fine and fine irregular pores; 20 percent pumice paragravel; slightly acid (pH 6.5); gradual wavy boundary.
Bw3—33 to 60 inches; pale brown (10YR 6/3) paragravelly ashy coarse sandy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common very fine and fine irregular pores; 25 percent pumice paragravel; slightly acid (pH 6.5).

Range in Characteristics

Thickness of the material influenced by volcanic ash and pumice: Throughout the profile
Content of pumice paragravel fragments in the particle-size control section: 10 to 25 percent

A horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Content of pumice paragravel—5 to 15 percent

Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—ashy sandy loam, ashy coarse sandy loam, or paragravelly ashy coarse sandy loam
Content of pumice paragravel—10 to 25 percent

Vingulch Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Ridges, shoulders, and upper backslopes
Parent material: Volcanic ash and pumice (14 to 36 inches) over residuum and colluvium from sedimentary and volcanic rock
Slope: 35 to 65 percent
Elevation: 1,400 to 5,300 feet
Mean annual precipitation: 20 to 25 inches
Mean annual air temperature: 40 to 45 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Ashy over loamy-skeletal, glassy over isotic, frigid Typic Vitrixerands

Typical Pedon

Vingulch ashy loamy very fine sand, in an area of Thow-Vingulch complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; in Okanogan County, about 5 miles west of Methow, Washington; 2,300 feet east and 70 feet south of the northwest corner of sec. 8, T. 30 N., R. 22 E.; latitude 48 degrees 7 minutes 8 seconds north and longitude 120 degrees 6 minutes 43 seconds west.

Oi—1 inch to 0; slightly decomposed forest litter; abrupt smooth boundary.
C—0 to 3 inches; white (10YR 8/1) ashy loamy very fine sand, grayish brown (10YR 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common very fine and fine irregular pores; slightly acid (pH 6.5); abrupt wavy boundary.
2A—3 to 11 inches; light brownish gray (10YR 6/2) ashy coarse sandy loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; many very fine and fine irregular pores; 10 percent pumice; slightly acid (pH 6.5); gradual wavy boundary.
2Bw1—11 to 21 inches; light brownish gray (10YR 6/2) paragravelly ashy coarse sandy loam, brown (10YR 5/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine irregular pores; 20 percent pumice; neutral (pH 6.8); gradual wavy boundary.
2Bw2—21 to 27 inches; light gray (10YR 7/2) paragravelly ashy coarse sandy loam, brown (10YR 5/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine irregular pores; 25 percent pumice; neutral (pH 6.8); gradual wavy boundary.
2C1—27 to 33 inches; very pale brown (10YR 8/2) paragravelly ashy loamy coarse sand, light brownish gray (10YR 6/2) moist; single grain; loose, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine irregular pores; 15 percent pumice; neutral (pH 6.8); gradual wavy boundary.

3C2—33 to 38 inches; very pale brown (10YR 8/2) very gravelly sandy loam, light brownish gray (10YR 6/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine irregular pores; 35 percent gravel and 5 percent cobbles; neutral (pH 6.8); abrupt wavy boundary.
3R—38 inches; fractured gneiss.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the material influenced by volcanic ash and pumice: 14 to 36 inches
Content of pumice fragments: 5 to 25 percent in the ashy layer
Rock fragments: 35 to 60 percent in the layers below the ashy material

C horizon:
- Value—6 to 8 dry, 4 to 6 moist
- Chroma—1 or 2 dry or moist
- Content of pumice—0 to 5 percent

2A horizon:
- Value—5 or 6 dry, 3 or 4 moist
- Chroma—1 or 2 dry or moist
- Texture—ashy sandy loam or ashy coarse sandy loam; paragravelly in some pedons
- Content of pumice—0 to 20 percent

2Bw horizon:
- Value—5 to 7 dry, 4 or 5 moist
- Chroma—2 to 4 dry or moist
- Texture—ashy sandy loam or ashy coarse sandy loam; paragravelly in some pedons
- Content of pumice—5 to 30 percent

2C horizon:
- Value—6 to 8 dry, 5 or 6 moist
- Chroma—2 or 3 dry or moist
- Texture—ashy sandy loam, ashy coarse sandy loam, or ashy loamy coarse sand; paragravelly in some pedons
- Content of pumice—5 to 30 percent

3C horizon:
- Value—6 to 8 dry, 5 or 6 moist
- Chroma—2 or 3 dry or moist
- Texture—very gravelly loamy sand, very gravelly loamy coarse sand, very gravelly coarse sandy loam, or very gravelly sandy loam
- Content of gravel—35 to 55 percent
- Content of cobbles—0 to 15 percent

Vitrandic Dystrocryepts

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, shoulders, ridges, cirque basins, and cirque headwalls
Parent material: Mixed volcanic ash (7 to 25 inches) over residuum and colluvium from granitic, metamorphic, sedimentary, and volcanic rock
Slope: 5 to 90 percent

Elevation: 4,900 to 8,000 feet
Mean annual precipitation: 40 to 90 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 40 to 70 days
Taxonomic classification: Vitrandic Dystrocryepts

Reference Pedon

Vitrandic Dystrocryepts, in an area of Vitrandic Dystrocryepts, 5 to 35 percent slopes; Okanogan National Forest Area, Washington; about 4 miles north-northwest of Harts Pass; 2,000 feet east and 200 feet north of the southwest corner of sec. 27, T. 38 N., R. 17 E.; latitude 48 degrees 45 minutes 30 seconds north and longitude 120 degrees 43 minutes 38 seconds west.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) gravelly ashy sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and few medium roots; few very fine tubular pores; 15 percent gravel; moderately acid; clear smooth boundary.

A2—4 to 12 inches; very dark grayish brown (10YR 3/2) gravelly ashy sandy loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and few medium roots; few very fine tubular pores; 20 percent gravel; moderately acid; clear smooth boundary.

Bw—12 to 20 inches; dark yellowish brown (10YR 4/4) very gravelly ashy sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; few very fine tubular pores; 40 percent gravel and 3 percent cobbles; moderately acid; clear wavy boundary.

2C—20 to 31 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; few very fine tubular pores; 40 percent gravel and 15 percent cobbles; moderately acid.

2R—31 inches; sandstone.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the material influenced by mixed volcanic ash: 7 to 25 inches
Thickness of the umbric epipedon: 7 to 16 inches
Content of rock fragments in the particle-size control section: 20 to 75 percent
Soil moisture regime: Udic

A horizon:

Value—3 to 5 dry, 2 or 3 moist
Chroma—2 or 3 dry or moist
Texture—gravelly ashy sandy loam, stony ashy sandy loam, or stony ashy fine sandy loam
Content of gravel—5 to 20 percent
Content of cobbles—0 to 10 percent
Content of stones—0 to 25 percent

Bw horizon:

Value—4 to 6 dry, 3 to 5 moist
Chroma—2 to 4 dry or moist
Texture—stony ashy loam, cobbly ashy loam, gravelly ashy sandy loam, very gravelly ashy sandy loam, very cobbly ashy sandy loam, or extremely cobbly ashy sandy loam

Content of gravel—5 to 40 percent
Content of cobbles—3 to 30 percent
Content of stones—0 to 10 percent

2C horizon:
Hue—10YR or 2.5Y
Value—5 to 7 dry, 3 to 5 moist
Chroma—2 to 5 dry, 2 to 4 moist
Texture—cobbly sandy loam, very gravelly sandy loam, very cobbly sandy loam, extremely cobbly sandy loam, very stony coarse sandy loam, or extremely gravelly sandy loam
Content of gravel—10 to 40 percent
Content of cobbles—3 to 40 percent
Content of stones—0 to 20 percent

Vitrandic Dystrudepts

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and shoulders, generally on southerly aspects
Parent material: Mixed volcanic ash (7 to 14 inches) over residuum and colluvium
Slope: 60 to 90 percent
Elevation: 3,500 to 5,500 feet
Mean annual precipitation: 40 to 60 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 85 to 120 days
Taxonomic classification: Vitrandic Dystrudepts

Reference Pedon

Vitrandic Dystrudepts, in an area of Rock outcrop-Vitrandic Dystrudepts association, 60 to 90 percent slopes; Okanogan National Forest Area, Washington; about 6 miles south-southeast of Crater Mountain; 2,000 feet east and 2,000 feet north of the southwest corner of sec. 34, T. 38 N., R. 17 E.; latitude 48 degrees 44 minutes 36 seconds north and longitude 120 degrees 43 minutes 42 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.
A—0 to 4 inches; brown (10YR 5/3) gravelly ashy sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure parting to weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; common fine irregular pores; 25 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.
Bw—4 to 11 inches; yellowish brown (10YR 5/4) very gravelly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; common fine irregular pores; 40 percent gravel and 5 percent cobbles; slightly acid; gradual wavy boundary.
2BC—11 to 20 inches; pale brown (10YR 6/3) extremely gravelly sandy loam, yellowish brown (10YR 5/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; few fine irregular pores; 50 percent gravel and 15 percent cobbles; slightly acid; gradual wavy boundary.
2C—20 to 27 inches; pale brown (10YR 6/3) extremely gravelly loamy coarse sand, yellowish brown (10YR 5/4) moist; massive; loose, nonsticky and nonplastic; few

very fine and fine roots; 55 percent gravel and 15 percent cobbles; slightly acid; abrupt wavy boundary.
R—27 inches; granodiorite.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the material influenced by mixed volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 25 to 70 percent

A horizon:
Value—4 to 6 dry, 3 to 5 moist
Chroma—2 or 3 dry or moist
Content of gravel—15 to 30 percent
Content of cobbles—0 to 5 percent

Bw horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—gravelly or very gravelly ashy sandy loam
Content of gravel—25 to 45 percent
Content of cobbles—0 to 10 percent

2BC horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—extremely gravelly sandy loam, very gravelly loamy coarse sand, or gravelly sandy loam
Content of gravel—25 to 50 percent
Content of cobbles—0 to 15 percent

2C horizon:
Value—5 to 7 dry, 4 to 6 moist
Chroma—3 or 4 dry or moist
Texture—very gravelly sandy loam, extremely gravelly loamy coarse sand, or extremely gravelly sandy loam
Content of gravel—35 to 60 percent
Content of cobbles—0 to 15 percent
Content of stones—0 to 5 percent

Vitrandic Eutrocryepts

Soil depth: Very deep
Drainage class: Moderately well drained
Landscape: Mountains
Position on landscape: Outwash plains and terraces
Parent material: Mixed volcanic ash (7 to 21 inches) over glacial till and outwash
Slope: 0 to 5 percent
Elevation: 4,400 to 5,100 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Vitrandic Eutrocryepts

Reference Pedon

Vitrandic Eutrocryepts, in an area of Vitrandic Eutrocryepts-Cryaquolls complex, 0 to 5 percent slopes; Okanogan National Forest Area, Washington; about 5 miles northwest of Wauconda, Washington; 5 miles southwest of Bonaparte Lake; 1,300 feet west

and 1,500 feet north of the southeast corner of sec. 35, T. 38 N., R. 29 E.; latitude 48 degrees 44 minutes 41 seconds north and longitude 119 degrees 7 minutes 33 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles, twigs, and grass.
A—0 to 3 inches; light brownish gray (10YR 6/2) ashy fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many very fine and fine and common medium roots; few fine pores; moderately acid; clear wavy boundary.
Bw1—3 to 11 inches; light brownish gray (10YR 6/2) ashy fine sandy loam, dark grayish brown (10YR 4/2) moist; moderate fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine, many medium, and common coarse roots; few fine pores; slightly acid; gradual wavy boundary.
Bw2—11 to 20 inches; light gray (10YR 7/2) ashy fine sandy loam, grayish brown (10YR 5/2) moist; moderate fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and common fine and medium roots; few fine pores; 5 percent gravel; slightly acid; clear wavy boundary.
2C1—20 to 27 inches; light gray (10YR 7/2) very gravelly fine sandy loam, light olive brown (2.5Y 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; few fine pores; 40 percent gravel; slightly acid; gradual wavy boundary.
2C2—27 to 41 inches; very pale brown (10YR 7/3) very gravelly sandy loam, light olive brown (2.5Y 5/3) moist; thin lenses of fine sandy loam; common fine faint light yellowish brown (2.5Y 6/3) redoximorphic concentrations; massive; soft, very friable, nonsticky and nonplastic; 45 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.
2Cg—41 to 60 inches; light gray (10YR 7/2) very gravelly sandy loam, light brownish gray (2.5Y 6/2) moist; many medium prominent yellowish brown (10YR 5/6) redoximorphic concentrations; massive; slightly hard, firm, nonsticky and nonplastic; 55 percent gravel; neutral.

Range in Characteristics

Depth to redoximorphic features: 25 to 40 inches
Depth to redoximorphic features having chroma of 2 or less: 35 to 50 inches
Depth to glacial outwash or glacial till: 12 to 25 inches
Thickness of the material influenced by mixed volcanic ash: 12 to 25 inches
Content of rock fragments in the particle-size control section: 15 to 60 percent
Soil moisture regime: Xeric
Seasonal high water table: Present in spring and summer

A horizon:
Chroma—2 or 3 dry or moist
Content of gravel—0 to 10 percent

Bw horizon:
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—ashy fine sandy loam, gravelly ashy sandy loam, or gravelly ashy fine sandy loam
Content of gravel—0 to 25 percent
Content of cobbles—0 to 10 percent
Content of stones—0 to 5 percent

2C horizon:
Hue—10YR or 2.5Y
Value—5 to 7 dry, 4 or 5 moist

Chroma—2 or 3 dry or moist
Texture—gravelly fine sandy loam, very gravelly sandy loam, or very gravelly fine sandy loam
Content of gravel—15 to 50 percent
Content of cobbles—0 to 10 percent

2Cg horizon:
Hue—10YR or 5Y
Value—7 or 8 dry
Chroma—2 or 3 dry or moist
Texture—gravelly loamy sand, very gravelly sandy loam, or very cobbly coarse sandy loam
Content of gravel—15 to 55 percent
Content of cobbles—0 to 20 percent

Vitrandic Haploxerepts

Soil depth: Deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, shoulders, alluvial fans, and ridges
Parent material: Mixed volcanic ash (10 to 22 inches) over residuum and colluvium from dominantly sedimentary rock and some volcanic rock
Slope: 15 to 75 percent
Elevation: 2,500 to 5,000 feet
Mean annual precipitation: 20 to 25 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Vitrandic Haploxerepts

Reference Pedon

Vitrandic Haploxerepts, in an area of Vitrandic Haploxerepts, 35 to 75 percent slopes; Okanogan National Forest Area, Washington; about 8 miles northwest of Mazama, Washington; 2,000 feet west and 2,600 feet south of the northeast corner of sec. 36, T. 37 N., R. 19 E.; latitude 48 degrees 39 minutes 51 seconds north and longitude 120 degrees 32 minutes 45 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles, leaves, and twigs; abrupt smooth boundary.
A—0 to 4 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many fine and very fine and few medium and coarse roots; common fine irregular pores; 15 percent gravel and 5 percent cobbles; neutral; clear smooth boundary.
Bw1—4 to 9 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, dark brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many fine and very fine and few medium and coarse roots; common fine irregular pores; 15 percent gravel, 5 percent cobbles, and 5 percent stones; slightly acid; clear wavy boundary.
Bw2—9 to 15 inches; pale brown (10YR 6/3) very gravelly ashy sandy loam, dark brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; few fine irregular pores; 25 percent gravel, 5 percent cobbles, and 5 percent stones; slightly acid; clear wavy boundary.
BC—15 to 22 inches; pale brown (10YR 6/3) very gravelly ashy loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable,

nonsticky and nonplastic; common very fine and fine roots; 35 percent gravel, 5 percent cobbles, and 10 percent stones; slightly acid; gradual wavy boundary.
2C1—22 to 35 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, grayish brown (10YR 5/2) moist; massive; soft, friable, slightly sticky and nonplastic; few very fine, fine, and medium roots; 40 percent gravel and 5 percent cobbles; slightly acid; gradual wavy boundary.
2C2—35 to 45 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, grayish brown (10YR 5/2) moist; massive; soft, friable, slightly sticky and nonplastic; few very fine roots; 45 percent gravel and 5 percent cobbles; slightly acid.
2R—45 inches; sedimentary rock.

Range in Characteristics

Depth to bedrock: 40 to 60 inches
Thickness of the material influenced by mixed volcanic ash: 10 to 22 inches
Content of rock fragments in the particle-size control section: 25 to 75 percent
Reaction: Slightly acid or neutral

A horizon:
Value—4 to 6 dry, 3 to 5 moist
Chroma—2 or 3 dry or moist
Texture—gravelly or stony ashy sandy loam
Content of gravel—15 to 30 percent
Content of cobbles—0 to 5 percent
Content of stones—0 to 10 percent

Bw horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—gravelly, very gravelly, or cobbly ashy loam; sandy in some pedons
Content of gravel—15 to 40 percent
Content of cobbles—0 to 15 percent
Content of stones—0 to 5 percent

2C horizon:
Value—5 to 7 dry, 4 to 6 moist
Chroma—2 to 4 dry or moist
Texture—dominantly very gravelly, gravelly, cobbly, or stony sandy loam; very gravelly loamy sand below 40 inches in some pedons
Content of gravel—20 to 55 percent
Content of cobbles—5 to 25 percent
Content of stones—0 to 15 percent

Volmont Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, shoulders, and ridges
Parent material: Mixed volcanic ash (7 to 14 inches) over residuum and colluvium from volcanic rock
Slope: 35 to 65 percent
Elevation: 4,500 to 6,000 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Loamy-skeletal, isotic Vitrandic Eutrocryepts

Typical Pedon

Volmont gravelly ashy sandy loam, in an area of Volmont-Rock outcrop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 3 miles north-northwest of Mazama, Washington; 3,300 feet west and 1,200 feet north of the southeast corner of sec. 12, T. 36 N., R. 19 E.; latitude 48 degrees 37 minutes 56 seconds north and longitude 120 degrees 25 minutes 1 second west.

Oe—1 inch to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.

A—0 to 4 inches; grayish brown (10YR 5/2) gravelly ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common fine irregular pores; 20 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.

Bw—4 to 13 inches; pale brown (10YR 6/3) very gravelly ashy sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; common very fine and fine irregular pores; 35 percent gravel and 5 percent cobbles; slightly acid; gradual wavy boundary.

2BC—13 to 21 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; few fine irregular pores; 30 percent gravel, 15 percent cobbles, and 5 percent stones; slightly acid; gradual wavy boundary.

2C—21 to 32 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, brown (10YR 5/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; few fine irregular pores; 30 percent gravel, 15 percent cobbles, and 10 percent stones; slightly acid; gradual wavy boundary.

2R—32 inches; fractured andesite.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the material influenced by mixed volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 70 percent
Soil moisture regime: Xeric

A horizon:

Chroma—2 or 3 dry or moist
Content of gravel—15 to 20 percent
Content of cobbles—0 to 5 percent

Bw horizon:

Chroma—3 or 4 moist
Texture—very gravelly ashy sandy loam or very cobbly sandy loam
Content of gravel—30 to 40 percent
Content of cobbles—5 to 20 percent
Content of stones—0 to 3 percent

2C horizon:

Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly sandy loam, extremely cobbly sandy loam, or very gravelly loam
Content of gravel—30 to 45 percent
Content of cobbles—10 to 30 percent
Content of stones—5 to 10 percent

Wagberg Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Foothills and mountains
Position on landscape: Backslopes, footslopes, and moraines
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial till derived from granitic and metamorphic rocks
Slope: 15 to 65 percent
Elevation: 2,000 to 3,700 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 140 days
Taxonomic classification: Loamy-skeletal, mixed, superactive, mesic Vitrandic Haploxerolls

Typical Pedon

Wagberg ashy sandy loam, in an area of Wagberg-Swakane-Rock outcrop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 800 feet east of Wenner Lakes; Thrapp Mountain USGS quadrangle; sec. 31, T. 33 N., R. 23 E.; latitude 48 degrees 18 minutes 49 seconds north and longitude 120 degrees 0 minutes 2 seconds west.

A—0 to 10 inches; grayish brown (10YR 5/2) ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; common medium tubular pores; 5 percent gravel; neutral; clear smooth boundary.

Bw1—10 to 14 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common medium irregular and tubular pores; 15 percent gravel and 5 percent cobbles; slightly acid; gradual wavy boundary.

2Bw2—14 to 24 inches; very pale brown (10YR 7/3) very gravelly sandy loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common medium irregular and tubular roots; 30 percent gravel and 10 percent cobbles; slightly acid; gradual wavy boundary.

2C1—24 to 35 inches; light gray (10YR 7/2) very gravelly sandy loam, grayish brown (10YR 5/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common fine and very fine roots; common medium irregular pores; 40 percent gravel and 10 percent cobbles; slightly acid; gradual wavy boundary.

2C2—35 to 60 inches; light brownish gray (2.5Y 6/2) very gravelly loamy sand, dark grayish brown (2.5Y 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; common medium irregular pores; 30 percent gravel and 15 percent cobbles; neutral.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent
Thickness of the mollic epipedon: 10 to 18 inches

A horizon:
Value—4 or 5 dry, 2 or 3 moist
Chroma—2 or 3 dry or moist
Content of gravel—0 to 15 percent
Content of cobbles—0 to 5 percent

Bw horizon (where present):
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—gravelly ashy sandy loam or gravelly ashy fine sandy loam
Content of gravel—15 to 30 percent
Content of cobbles—0 to 10 percent

2Bw horizon:
Hue—10YR or 2.5Y
Value—5 to 7 dry, 4 or 5 moist
Chroma—2 to 4 dry or moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—15 to 35 percent
Content of cobbles—5 to 20 percent

2C horizon:
Hue—10YR or 2.5Y
Value—6 or 7 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly sandy loam, very cobbly sandy loam, very cobbly coarse sandy loam, or very gravelly loamy sand
Content of gravel—30 to 50 percent
Content of cobbles—10 to 20 percent

Wapal Series

Soil depth: Very deep
Drainage class: Somewhat excessively drained
Landscape: Mountains
Position on landscape: Outwash terraces and terrace escarpments
Parent material: Mixed volcanic ash (7 to 14 inches) over glacial outwash
Slope: 0 to 65 percent
Elevation: 2,200 to 5,600 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 40 to 46 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Sandy-skeletal, isotic, frigid Vitrandic Haploxerepts

Typical Pedon

Wapal stony ashy coarse sandy loam, in an area of Wapal stony ashy coarse sandy loam, 0 to 15 percent slopes; Okanogan National Forest Area, Washington; about 15 miles north of Winthrop, Washington; 100 feet west and 1,350 feet south of the northeast corner of sec. 19, T. 37 N., R. 22 E.; latitude 48 degrees 4 minutes 40 seconds north and longitude 120 degrees 7 minutes 24 seconds west.

Oi—1 inch to 0; slightly decomposed mat of needles and twigs; abrupt smooth boundary.
A—0 to 4 inches; brown (10YR 5/3) stony ashy coarse sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; few fine irregular pores; 20 percent gravel, 5 percent cobbles, and 5 percent stones; slightly acid; clear wavy boundary.
Bw—4 to 11 inches; pale brown (10YR 6/3) very gravelly ashy coarse sandy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium

and coarse roots; few fine irregular pores; 35 percent gravel; slightly acid; clear wavy boundary.

2C1—11 to 32 inches; pale brown (10YR 6/3) extremely cobbly loamy coarse sand, brown (10YR 5/3) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; 40 percent gravel and 25 percent cobbles; slightly acid; gradual wavy boundary.

2C2—32 to 60 inches; very pale brown (10YR 7/3) very gravelly loamy coarse sand, brown (10YR 5/3) moist; single grain; loose, nonsticky and nonplastic; few very fine roots; 40 percent gravel and 10 percent cobbles; neutral.

Range in Characteristics

Depth to strongly contrasting textural stratification: 10 to 20 inches
Thickness of the material influenced by mixed volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 70 percent

A horizon:
- Value—5 or 6 dry, 3 or 4 moist
- Chroma—2 or 3 dry or moist
- Texture—stony ashy coarse sandy loam, ashy sandy loam, very stony ashy coarse sandy loam, or bouldery ashy sandy loam
- Content of gravel—15 to 25 percent
- Content of cobbles—0 to 5 percent
- Content of stones and boulders—0 to 15 percent

Bw horizon:
- Chroma—2 or 3 dry or moist
- Texture—gravelly ashy coarse sandy loam, very gravelly ashy coarse sandy loam, or gravelly ashy sandy loam
- Content of gravel—20 to 35 percent
- Content of cobbles—0 to 5 percent

2C horizon:
- Value—6 or 7 dry, 4 or 5 moist
- Texture—loamy coarse sand, loamy sand, or sand or the extremely cobbly or very gravelly analogs of those textures
- Content of gravel—40 to 60 percent
- Content of cobbles—5 to 25 percent

Wellie Series

Soil depth: Very deep
Drainage class: Somewhat excessively drained
Landscape: Mountains
Position on landscape: Backslopes
Parent material: Colluvium from granitic rock
Slope: 35 to 90 percent
Elevation: 2,800 to 5,900 feet
Mean annual precipitation: 18 to 24 inches
Mean annual air temperature: 42 to 46 degrees F
Frost-free period: 95 to 120 days
Taxonomic classification: Sandy-skeletal, isotic, frigid Typic Xerorthents

Typical Pedon

Wellie extremely stony loamy coarse sand, in an area of Rock outcrop-Wellie-Rubble land complex, 65 to 90 percent slopes; Okanogan National Forest Area, Washington; about 1.2 miles east-northeast of Andrews Creek campground and 550 feet north of

Forest Service road 5150–250; Coleman Peak USGS quadrangle; 1,600 feet north and 750 feet west of the southeast corner of sec. 35, T. 38 N., R. 22 E.; latitude 48 degrees 47 minutes 19 seconds north and longitude 120 degrees 4 minutes 59 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles and grasses; partially decomposed organic matter.
A—0 to 3 inches; dark grayish brown (10YR 4/2) extremely stony loamy coarse sand, very dark brown (10YR 2/2) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; common fine and few medium roots; common fine and medium irregular pores; 15 percent gravel, 20 percent cobbles, and 25 percent stones; neutral (pH 6.8); clear wavy boundary.
C1—3 to 16 inches; light brownish gray (10YR 6/2) extremely cobbly loamy coarse sand, dark grayish brown (10YR 4/2) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; few fine and medium roots; common fine and medium irregular pores; 30 percent gravel, 30 percent cobbles, and 5 percent stones; neutral (pH 6.6); gradual wavy boundary.
C2—16 to 60 inches; light brownish gray (10YR 6/2) extremely cobbly loamy coarse sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; few fine roots; common fine and medium irregular pores; 30 percent gravel, 30 percent cobbles, and 5 percent stones; slightly acid (pH 6.4).

Range in Characteristics

Content of rock fragments in the particle-size control section: 40 to 75 percent

A horizon:
- Thickness—0 to 5 inches
- Value—2 to 5 dry
- Chroma—1 to 3 dry, 1 or 2 moist

C horizon:
- Hue—2.5Y or 10YR
- Value—4 to 6 dry
- Chroma—1 to 4 dry or moist
- Texture—very cobbly, very gravelly, extremely cobbly, or extremely gravelly loamy coarse sand
- Content of gravel—20 to 35 percent
- Content of cobbles—20 to 40 percent
- Content of stones—0 to 10 percent

Wellsfar Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, shoulders, and ridges
Parent material: Mixed volcanic ash (7 to 14 inches) over residuum and colluvium from granitic rock
Slope: 15 to 65 percent
Elevation: 4,900 to 6,200 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 35 to 40 degrees F
Frost-free period: 60 to 85 days
Taxonomic classification: Loamy-skeletal, isotic Vitrandic Eutrocryepts

Typical Pedon

Wellsfar gravelly ashy sandy loam, in an area of Wellsfar-Sitdown complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 14 miles west of Loomis, Washington; 2,600 feet west and 500 feet south of the northeast corner of sec. 33, T. 39 N., R. 23 E.; latitude 48 degrees 50 minutes 29 seconds north and longitude 118 degrees 30 minutes 12 seconds west.

Oe—2 inches to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.

A—0 to 3 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and common medium and coarse roots; common very fine and fine pores; 25 percent gravel and 5 percent cobbles; slightly acid; clear smooth boundary.

Bw1—3 to 8 inches; light yellowish brown (10YR 6/4) gravelly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and common medium and coarse roots; common very fine and fine pores; 30 percent gravel; slightly acid; clear smooth boundary.

2Bw2—8 to 16 inches; light yellowish brown (10YR 6/4) very gravelly coarse sandy loam, yellowish brown (10YR 5/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; few fine pores; 40 percent gravel; moderately acid; clear wavy boundary.

2C—16 to 25 inches; very pale brown (10YR 7/4) very gravelly coarse sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; 50 percent gravel and 5 percent cobbles; strongly acid; clear wavy boundary.

2Cr—25 inches; weathered granite.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the material influenced by mixed volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 60 percent
Soil moisture regime: Xeric

A horizon:
- Value—5 or 6 dry, 3 or 4 moist
- Chroma—3 or 4 dry or moist
- Content of gravel—15 to 30 percent
- Content of cobbles—0 to 5 percent

Bw1 horizon:
- Value—5 or 6 dry, 3 or 4 moist
- Chroma—3 or 4 dry or moist
- Content of gravel—15 to 30 percent
- Content of cobbles—0 to 5 percent

2Bw2 horizon:
- Value—6 or 7 dry, 4 or 5 moist
- Chroma—3 to 6 dry or moist
- Texture—very gravelly sandy loam or very gravelly coarse sandy loam
- Content of gravel—35 to 50 percent
- Content of cobbles—0 to 5 percent

2C horizon:
Value—5 to 7 dry, 4 to 6 moist
Chroma—3 to 6 dry or moist
Texture—very gravelly sandy loam, very gravelly coarse sandy loam, or very cobbly coarse sandy loam
Content of gravel—35 to 55 percent
Content of cobbles—0 to 20 percent

Wenner Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Foothills
Position on landscape: Hillslopes and terraces
Parent material: Mixed volcanic ash (10 to 18 inches) over glacial till from metamorphic and metaigneous rock
Slope: 15 to 65 percent
Elevation: 2,400 to 3,500 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 45 to 52 degrees F
Frost-free period: 100 to 130 days
Taxonomic classification: Fine-loamy, mixed, superactive, mesic Vitrandic Argixerolls

Typical Pedon

Wenner ashy loam, in an area of Wenner ashy loam, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 1,500 feet east and 1,900 feet south of the northwest corner of sec. 31, T. 33 N., R. 23 E.; latitude 48 degrees 19 minutes 4 seconds north and longitude 120 degrees 0 minutes 24 seconds west.

A1—0 to 5 inches; dark grayish brown (10YR 4/2) ashy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; many very fine irregular and common very fine tubular pores; 10 percent gravel; neutral; clear smooth boundary.

A2—5 to 12 inches; dark grayish brown (10YR 4/2) gravelly ashy sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; many very fine irregular and common very fine tubular pores; 15 percent gravel; neutral; clear wavy boundary.

AB—12 to 18 inches; grayish brown (10YR 5/2) gravelly ashy sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; many very fine irregular and common very fine tubular pores; 15 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.

2Bt1—18 to 25 inches; grayish brown (10YR 5/2) gravelly clay loam, dark grayish brown (10YR 4/2) moist; moderate fine and medium subangular blocky structure; hard, firm, slightly sticky and moderately plastic; common very fine and fine roots; common very fine tubular pores; common distinct clay films on faces of peds and in pores; 20 percent gravel; neutral; clear wavy boundary.

2Bt2—25 to 33 inches; brown (10YR 5/3) gravelly clay loam, dark brown (10YR 4/3) moist; moderate medium angular blocky structure; hard, firm, moderately sticky and moderately plastic; few very fine and fine roots; common very fine tubular pores; common distinct clay films on faces of peds and in pores and few distinct

clay films on rock fragments; 25 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.

2Bt3—33 to 60 inches; brown (10YR 5/3) gravelly clay loam, dark brown (10YR 4/3) moist; moderate medium angular blocky structure; very hard, firm, moderately sticky and moderately plastic; few very fine roots; common very fine tubular pores; common distinct clay films on faces of peds and in pores; 25 percent gravel and 5 percent cobbles; neutral.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 10 to 18 inches
Content of rock fragments in the particle-size control section: 20 to 30 percent
Thickness of the mollic epipedon: 10 to 18 inches

A1 horizon:
Value—4 or 5 dry

A2 horizon:
Value—4 or 5 dry
Texture—ashy loam or gravelly ashy sandy loam
Content of gravel—5 to 15 percent

AB horizon:
Value—3 to 5 dry, 2 or 3 moist
Chroma—2 or 3 dry
Texture—gravelly ashy sandy loam, gravelly ashy loam, or ashy sandy loam
Content of gravel—5 to 20 percent
Content of cobbles—0 to 5 percent

2Bt horizon:
Chroma—2 or 3 dry or moist
Texture—gravelly clay loam or gravelly sandy clay loam
Content of gravel—15 to 25 percent
Content of cobbles—0 to 5 percent

Wilder Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and terrace escarpments
Parent material: Mixed volcanic ash (14 to 20 inches) over glaciofluvial deposits
Slope: 35 to 65 percent
Elevation: 2,500 to 3,410 feet
Mean annual precipitation: 17 to 20 inches
Mean annual air temperature: 40 to 43 degrees F
Frost-free period: 90 to 130 days
Taxonomic classification: Sandy, isotic, frigid Vitrandic Haploxerolls

Typical Pedon

Wilder ashy sandy loam, in an area of Wilder-Republic complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 4 miles west of Concoully, Washington; 1,300 feet west and 2,600 feet south of the northeast corner of sec. 5, T. 35 N., R. 24 E.; latitude 48 degrees 33 minutes 42 seconds north and longitude 119 degrees 50 minutes 47 seconds west.

Oe—1 inch to 0; moderately decomposed needles, grasses, and partially decomposed organic matter; abrupt smooth boundary.

A1—0 to 6 inches; grayish brown (10YR 5/2) ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to moderate fine and medium granular; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; common fine irregular pores; 2 percent gravel; neutral; clear smooth boundary.

A2—6 to 10 inches; grayish brown (10YR 5/2) ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; common fine irregular pores; 4 percent gravel; neutral; clear smooth boundary.

Bw—10 to 15 inches; yellowish brown (10YR 5/4) ashy sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; common irregular pores; 7 percent gravel; neutral; clear smooth boundary.

2BC—15 to 21 inches; pale brown (10YR 6/3) loamy sand; dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; common very fine and few fine roots; common fine and medium irregular pores; 10 percent gravel; neutral; gradual smooth boundary.

2C1—21 to 39 inches; pale brown (10YR 6/3) gravelly loamy sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; few fine and very fine roots; common fine and medium irregular pores; 30 percent gravel; neutral; gradual smooth boundary.

2C2—39 to 60 inches; pale brown (10YR 6/3) sand; dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; few very fine, fine, and medium roots; common medium irregular pores; 8 percent gravel; neutral.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 14 to 20 inches
Thickness of the mollic epipedon: 10 to 20 inches
Content of rock fragments in the particle-size control section: 5 to 25 percent

A horizon:
- Value—4 or 5 dry, 2 or 3 moist
- Chroma—1 to 3 dry or moist

Bw horizon:
- Value—5 or 6 dry, 3 or 4 moist
- Chroma—3 or 4 dry or moist
- Texture—ashy sandy loam or ash fine sandy loam
- Content of gravel—0 to 10 percent

2BC and 2C horizons:
- Value—6 or 7 dry, 4 to 6 moist
- Chroma—2 to 4 dry or moist
- Texture—sand, loamy sand, loamy coarse sand, gravelly loamy sand, or gravelly loamy coarse sand
- Content of gravel—5 to 30 percent

Wilma Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, shoulders, and ridges
Parent material: Volcanic ash (10 to 14 inches) over residuum and colluvium from granitic and metaigneous rock
Slope: 15 to 65 percent

Elevation: 2,600 to 5,300 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Andic Haploxerepts

Typical Pedon

Wilma gravelly ashy fine sandy loam, in an area of Wilma-Lithic Haploxerepts-Rock outcrop complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 7 miles southeast of Oroville, Washington; 700 feet west and 2,300 feet south of the northeast corner of sec. 4, T. 39 N., R. 28 E.; latitude 48 degrees 53 minutes 56 seconds north and longitude 119 degrees 18 minutes 0 seconds west.

Oi—1 inch to 0; slightly decomposed mat of needles, twigs, and grasses; abrupt smooth boundary.
A—0 to 6 inches; pale brown (10YR 6/3) gravelly ashy fine sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common fine and medium tubular pores; 15 percent gravel; slightly acid; clear smooth boundary.
Bw—6 to 12 inches; pale brown (10YR 6/3) gravelly ashy fine sandy loam, brown (10YR 4/3) moist; soft, very friable, nonsticky and nonplastic; common fine and few medium roots; common fine and medium tubular pores; 20 percent gravel and 5 percent cobbles; slightly acid; gradual wavy boundary.
2BC—12 to 17 inches; light yellowish brown (10YR 6/4) very cobbly fine sandy loam, brown (10YR 5/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common fine roots; common fine tubular pores; 25 percent gravel, 10 percent cobbles, and 5 percent stones; slightly acid; gradual wavy boundary.
2C—17 to 28 inches; light yellowish brown (2.5Y 6/3) extremely gravelly coarse sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few fine roots; few tubular pores; 40 percent gravel, 15 percent cobbles, and 5 percent stones.
2R—28 inches; granite.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Thickness of the material influenced by volcanic ash: 10 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 65 percent

A horizon:
Value—4 to 6 dry, 3 or 4 moist
Chroma—2 or 3 dry or moist
Texture—gravelly or stony ashy fine sandy loam
Content of gravel—10 to 15 percent
Content of cobbles—0 to 10 percent
Content of stones—0 to 15 percent

Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—2 to 4 dry or moist
Content of gravel—10 to 25 percent
Content of cobbles—0 to 10 percent
Content of stones—0 to 5 percent

2BC horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 to 4 dry or moist

Texture—very cobbly fine sandy loam, very cobbly sandy loam, very gravelly sandy loam, or very gravelly fine sandy loam
Content of gravel—25 to 35 percent
Content of cobbles—10 to 20 percent
Content of stones—0 to 5 percent

2C horizon:
Hue—10YR or 2.5Y
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 to 4 dry or moist
Texture—extremely gravelly coarse sandy loam, very cobbly coarse sandy loam, or very gravelly sandy loam
Content of gravel—25 to 45 percent
Content of cobbles—10 to 20 percent
Content of stones—0 to 5 percent

Winsand Series

Soil depth: Deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes, generally on southerly aspects
Parent material: Mixed volcanic ash (7 to 14 inches) over colluvium from sedimentary rock
Slope: 35 to 65 percent
Elevation: 4,800 to 5,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 42 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Loamy-skeletal, isotic Vitrandic Eutrocryepts

Typical Pedon

Winsand gravelly ashy sandy loam, in an area of Winsand-Verhart complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 5 miles north of Mazama, Washington; 500 feet west and 1,900 feet north of the southeast corner of sec. 36, T. 37 N., R. 19 E.; latitude 48 degrees 39 minutes 40 seconds north and longitude 120 degrees 24 minutes 43 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.
A—0 to 5 inches; brown (10YR 4/3) gravelly ashy sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine irregular pores; 15 percent gravel; neutral; clear smooth boundary.
Bw—5 to 12 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; common fine irregular pores; 20 percent gravel; slightly acid; clear smooth boundary.
2C1—12 to 24 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, slightly sticky and nonplastic; common very fine and fine roots; few fine irregular pores; 25 percent gravel and 20 percent cobbles; slightly acid; clear wavy boundary.
2C2—24 to 43 inches; light yellowish brown (10YR 6/4) very cobbly sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, friable, slightly sticky and slightly

plastic; few very fine and fine roots; few very fine irregular pores; 25 percent gravel, 30 percent cobbles, and 3 percent stones; slightly acid; gradual wavy boundary.

2R—43 inches; sandstone.

Range in Characteristics

Depth to bedrock: 40 to 60 inches
Thickness of the material influenced by mixed volcanic ash: 7 to 14 inches
Content of rock fragments in the particle-size control section: 35 to 65 percent
Soil moisture regime: Xeric

A horizon:
- Value—4 or 5 dry, 3 or 4 moist
- Chroma—2 or 3 dry or moist
- Content of gravel—15 to 20 percent

Bw horizon:
- Value—3 or 4 moist
- Texture—gravelly or very gravelly ashy sandy loam
- Content of gravel—15 to 30 percent
- Content of cobbles—0 to 5 percent

2C horizon:
- Chroma—3 or 4 dry or moist
- Texture—very gravelly or very cobbly sandy loam
- Content of gravel—25 to 40 percent
- Content of cobbles—10 to 30 percent
- Content of stones—0 to 5 percent

Winthrop Series

Soil depth: Very deep
Drainage class: Excessively drained
Landscape: Mountains
Position on landscape: Terraces and terrace escarpments
Parent material: Alluvium and glacial outwash
Slope: 0 to 45 percent
Elevation: 1,300 to 2,700 feet
Mean annual precipitation: 11 to 16 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 135 days
Taxonomic classification: Sandy-skeletal, mixed, mesic Entic Ultic Haploxerolls

Typical Pedon

Winthrop stony loamy sand; Okanogan County Area, Washington; 100 feet west and 50 feet north of the southeast corner of NE¼NE¼ sec. 20, T. 33 N., R. 22 E.; latitude 48 degrees 21 minutes 1 second north and longitude 120 degrees 6 minutes 10 seconds west.

A1—0 to 5 inches; dark grayish brown (10YR 4/2) stony loamy sand, very dark brown (10YR 2/2) moist; single grain; loose, nonsticky and nonplastic; many roots; 15 percent gravel, 10 percent stones, and 6 percent cobbles; neutral; abrupt smooth boundary.

A2—5 to 13 inches; grayish brown (10YR 5/2) gravelly loamy sand, very dark grayish brown (10YR 3/2) moist; single grain; loose, nonsticky and nonplastic; many roots; 20 percent gravel; neutral; abrupt smooth boundary.

C1—13 to 25 inches; brown (10YR 5/3) gravelly loamy sand, dark brown (10YR 3/3) moist; single grain; loose, nonsticky and nonplastic; common roots; 30 percent gravel; neutral; abrupt smooth boundary.
C2—25 to 60 inches; very gravelly sand; 50 percent gravel.

Range in Characteristics

Content of rock fragments in the particle-size control section: 35 to 70 percent
Thickness of the mollic epipedon: 8 to 15 inches

A horizon:
Value—3 to 5 dry, 2 or 3 moist
Chroma—2 or 3 dry or moist
Texture—gravelly, very gravelly, or stony loamy sand
Content of gravel—15 to 35 percent
Content of cobbles—0 to 5 percent
Content of stones—0 to 15 percent

C horizon:
Hue—10YR or 2.5Y
Value—5 to 7 dry, 3 to 5 moist
Chroma—2 to 4 dry or moist
Texture—loamy sand, sand, or coarse sand; gravelly, cobbly, very gravelly, or extremely gravelly
Content of gravel—30 to 55 percent
Content of cobbles—0 to 20 percent

Wocreek Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes and footslopes
Parent material: Volcanic ash (40 to 60 inches) over glacial till
Slope: 15 to 65 percent
Elevation: 4,000 to 6,000 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Ashy, glassy Xeric Vitricryands

Typical Pedon

Wocreek ashy sandy loam, in an area of Wocreek-Coopmont complex, 15 to 35 percent slopes; Okanogan National Forest Area, Washington; about 10 miles southwest of Methow, Washington; about 1,600 feet east and 700 feet south of the northwest corner of sec. 6, T. 29 N., R. 22 E.; latitude 48 degrees 2 minutes 50 seconds north and longitude 120 degrees 7 minutes 57 seconds west.

Oi—1 inch to 0; slightly decomposed forest litter; abrupt smooth boundary.
A—0 to 7 inches; light gray (10YR 7/2) ashy sandy loam, grayish brown (10YR 5/2) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common very fine and fine irregular pores; 10 percent paragravel and 2 percent gravel; slightly acid; clear wavy boundary.
Bw—7 to 34 inches; pale brown (10YR 6/3) paragravelly ashy sandy loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and

coarse roots; common very fine and fine irregular pores; 20 percent paragravel and 5 percent gravel; slightly acid; gradual wavy boundary.

BC—34 to 51 inches; pale brown (10YR 6/3) very gravelly ashy loamy coarse sand, grayish brown (10YR 5/2) moist; single grain; soft, loose, nonsticky and nonplastic; common very fine and fine and few medium roots; common fine and medium irregular pores; 50 percent gravel; slightly acid; clear wavy boundary.

2C—51 to 60 inches; light gray (10YR 7/2) gravelly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; few fine irregular pores; 15 percent gravel and 5 percent cobbles; slightly acid.

Range in Characteristics

Thickness of the material influenced by volcanic ash: 40 to 60 inches
Content of rock fragments in the particle-size control section: 0 to 25 percent

A horizon:
- Value—5 to 7 dry, 4 or 5 moist
- Chroma—2 or 3 dry or moist
- Content of paragravel—0 to 15 percent

Bw horizon:
- Value—5 to 7 dry, 4 or 5 moist
- Chroma—2 or 3 dry or moist
- Texture—ashy sandy loam or ashy coarse sandy loam; in some pedons paragravelly or very paragravelly
- Content of paragravel—15 to 40 percent

BC horizon:
- Value—6 or 7 dry, 4 or 5 moist
- Chroma—2 or 3 dry or moist
- Texture—ashy loamy coarse sand or ashy coarse sandy loam; very gravelly or gravelly
- Content of gravel—25 to 55 percent
- Content of cobbles—0 to 5 percent

2C horizon:
- Value—6 or 7 dry, 4 or 5 moist
- Chroma—2 or 3 dry or moist
- Texture—sandy loam or coarse sandy loam or the very gravelly, very cobbly, gravelly, or cobbly analogs of those textures
- Content of gravel—10 to 30 percent
- Content of cobbles—0 to 25 percent
- Content of stones—0 to 15 percent

Wynhoff Series

Soil depth: Moderately deep
Drainage class: Well drained
Landscape: Foothills and mountains
Position on landscape: Backslopes, shoulders, and ridges, generally on southerly aspects
Parent material: Residuum and colluvium from metasedimentary and granitic rock
Slope: 15 to 65 percent
Elevation: 2,500 to 4,700 feet
Mean annual precipitation: 15 to 18 inches
Mean annual air temperature: 47 to 52 degrees F

Frost-free period: 110 to 140 days
Taxonomic classification: Loamy-skeletal, mixed, superactive, mesic Typic Haploxerolls

Typical Pedon

Wynhoff gravelly sandy loam, in an area of Wynhoff gravelly sandy loam, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about 2 miles north of Conconully, Washington; 2,200 feet east and 300 feet south of the northwest corner of sec. 25, T. 36 N., R. 24 E.; latitude 48 degrees 35 minutes 46 seconds north and longitude 119 degrees 46 minutes 1 second west.

A1—0 to 5 inches; dark grayish brown (10YR 4/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine, common medium, and few coarse roots; common fine irregular pores; 15 percent gravel and 5 percent cobbles; neutral; gradual wavy boundary.
A2—5 to 9 inches; dark grayish brown (10YR 4/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium roots; common fine irregular pores; 20 percent gravel and 5 percent cobbles; neutral; clear smooth boundary.
Bw—9 to 18 inches; brown (10YR 5/3) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; many very fine and fine and few medium and coarse roots; common fine irregular pores; 35 percent gravel and 5 percent cobbles; neutral; clear wavy boundary.
C—18 to 24 inches; yellowish brown (10YR 5/4) extremely gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; massive; soft, friable, slightly sticky and slightly plastic; common very fine and fine and few medium roots; 45 percent gravel, 10 percent cobbles, and 5 percent stones; neutral; clear wavy boundary.
R—24 inches; metasedimentary rock.

Range in Characteristics

Depth to bedrock: 20 to 40 inches
Content of rock fragments in the particle-size control section: 40 to 70 percent
Thickness of the mollic epipedon: 9 to 15 inches

A horizon:
Value—4 or 5 dry
Chroma—2 or 3 dry or moist
Content of gravel—15 to 30 percent
Content of cobbles—0 to 5 percent
Surface stones—0 to 5 percent

Bw horizon:
Value—5 or 6 dry, 3 or 4 moist
Chroma—3 or 4 dry, 2 or 3 moist
Texture—very gravelly or very cobbly sandy loam
Content of gravel—20 to 45 percent
Content of cobbles—5 to 20 percent

C horizon:
Hue—10YR or 2.5Y
Value—5 or 6 dry, 4 or 5 moist
Chroma—3 or 4 dry or moist
Texture—extremely gravelly, very cobbly, or extremely cobbly sandy loam
Content of gravel—35 to 60 percent

Content of cobbles—5 to 20 percent
Content of stones—0 to 5 percent

Xeric Vitricryands

Soil depth: Deep or very deep
Drainage class: Well drained or somewhat excessively drained
Landscape: Mountains
Position on landscape: Backslopes and shoulders
Parent material: Volcanic ash (14 to 25 inches) over glacial till, colluvium, and residuum from sedimentary and granitic rock
Slope: 5 to 75 percent
Elevation: 3,900 to 5,800 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 37 to 41 degrees F
Frost-free period: 70 to 90 days
Taxonomic classification: Xeric Vitricryands

Reference Pedon

Xeric Vitricryands, in an area of Xeric Vitricryands-Andic Eutrocryepts-Rock outcrop association, 35 to 75 percent slopes; Okanogan National Forest Area, Washington; about 11 miles northwest of Mazama, Washington; 900 feet east and 2,330 feet south of the northwest corner of sec. 34, T. 37 N., R. 18 E.; latitude 48 degrees 39 minutes 55 seconds north and longitude 120 degrees 36 minutes 1 second west.

Oe—3 inches to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.
A—0 to 5 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, dark brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; moderately smeary; many very fine and fine and common medium and coarse roots; common fine irregular pores; 15 percent gravel; slightly acid; clear smooth boundary.
Bw1—5 to 10 inches; light yellowish brown (10YR 6/4) gravelly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; moderately smeary; many very fine and fine and few medium and coarse roots; common fine irregular pores; 15 percent gravel; slightly acid; clear smooth boundary.
Bw2—10 to 17 inches; brownish yellow (10YR 6/6) gravelly ashy sandy loam, dark yellowish brown (10YR 4/6) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; moderately smeary; many very fine and fine and few medium roots; common fine irregular pores; 25 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.
2BC—17 to 25 inches; light olive brown (2.5Y 5/3) very gravelly sandy loam, olive brown (2.5Y 4/3) moist; massive; soft, friable, nonsticky and nonplastic; common very fine and fine and few medium roots; few fine irregular pores; 35 percent gravel and 5 percent cobbles; slightly acid; clear wavy boundary.
2C—25 to 60 inches; grayish brown (2.5Y 5/2) very gravelly sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; soft, friable, nonsticky and nonplastic; few very fine and fine roots; 45 percent gravel and 5 percent cobbles; slightly acid.

Range in Characteristics

Depth to glacial till (where present): 20 to 40 inches
Depth to bedrock or densic material: 20 to more than 60 inches
Thickness of the material influenced by volcanic ash: 14 to 25 inches

Rock fragments: 10 to 45 percent in volcanic ash and 20 to 65 percent in till, colluvium, or residuum
Note: Some pedons have a C horizon directly below the organic layer. The C horizon consists of a 140 to 190 year old “T” or 450 to 500 year old “W” ash from Mount Saint Helens.

A horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—gravelly ashy sandy loam or gravelly ashy fine sandy loam
Content of gravel—15 to 25 percent
Content of stones—0 to 5 percent

Bw horizon:
Chroma—4 to 6 dry or moist
Texture—gravelly or stony ashy sandy loam
Content of gravel—15 to 30 percent
Content of cobbles—0 to 5 percent
Content of stones—0 to 10 percent

2BC horizon:
Hue—2.5Y or 10YR
Texture—very gravelly sandy loam, stony sandy loam, very cobbly sandy loam, or very gravelly loamy coarse sand
Content of gravel—15 to 45 percent
Content of cobbles—5 to 20 percent
Content of stones—0 to 10 percent

2C horizon:
Hue—2.5Y or 10YR
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 dry or moist
Texture—very gravelly or very stony sandy loam or gravelly, very gravelly, or extremely gravelly coarse sandy loam
Content of gravel—15 to 45 percent
Content of cobbles—0 to 20 percent
Content of stones—0 to 20 percent

Yellcreek Series

Soil depth: Very deep
Drainage class: Well drained
Landscape: Mountains
Position on landscape: Backslopes
Parent material: Mixed volcanic ash (7 to 25 inches) over colluvium and glacial till from volcanic and sedimentary rock
Slope: 35 to 65 percent
Elevation: 2,300 to 4,700 feet
Mean annual precipitation: 20 to 24 inches
Mean annual air temperature: 40 to 44 degrees F
Frost-free period: 90 to 120 days
Taxonomic classification: Loamy-skeletal, isotic, frigid Vitrandic Haploxerolls

Typical Pedon

Yellcreek gravelly ashy sandy loam, in an area of Yellcreek-Midpeak-Rock outcrop complex, 35 to 65 percent slopes; Okanogan National Forest Area, Washington; about

2 miles south-southeast of Mazama, Washington; 2,200 feet east and 500 feet south of the northwest corner of sec. 5, T. 36 N., R. 19 E.; latitude 48 degrees 38 minutes 50 seconds north and longitude 120 degrees 30 minutes 12 seconds west.

Oe—1 inch to 0; moderately decomposed mat of needles and twigs; abrupt smooth boundary.

A1—0 to 5 inches; very dark grayish brown (10YR 3/2) gravelly ashy sandy loam, black (10YR 2/1) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common very fine and fine tubular pores; 30 percent angular pebbles; neutral; clear wavy boundary.

A2—5 to 12 inches; grayish brown (10YR 5/2) very gravelly ashy sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; common very fine and fine tubular pores; 40 percent angular pebbles; neutral; gradual wavy boundary.

Bw—12 to 25 inches; light brownish gray (10YR 6/2) very gravelly ashy sandy loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; common fine irregular pores; 50 percent angular pebbles and 5 percent angular cobbles; neutral; gradual wavy boundary.

2C1—25 to 35 inches; light brownish gray (10YR 6/2) extremely gravelly sandy loam, grayish brown (10YR 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; few fine irregular pores; 60 percent angular pebbles and 10 percent angular cobbles; slightly acid; gradual wavy boundary.

2C2—35 to 60 inches; pinkish gray (7.5YR 6/2) extremely gravelly sandy loam, brown (7.5YR 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; few fine irregular pores; 70 percent angular pebbles and 10 percent angular cobbles; slightly acid.

Range in Characteristics

Thickness of the material influenced by mixed volcanic ash: 7 to 20 inches
Content of rock fragments in the particle-size control section: 50 to 80 percent
Thickness of the mollic epipedon: 7 to 15 inches

A horizon:
- Value—3 to 5 dry, 2 or 3 moist
- Chroma—2 or 3 dry or moist
- Content of gravel—20 to 40 percent

Bw horizon:
- Chroma—2 or 3 dry or moist
- Content of gravel—30 to 50 percent
- Content of cobbles—0 to 10 percent

2C horizon:
- Hue—10YR or 7.5YR
- Value—5 or 6 dry, 4 or 5 moist
- Chroma—2 or 3 dry or moist
- Texture—very gravelly, very cobbly, or extremely gravelly sandy loam
- Content of gravel—40 to 70 percent
- Content of cobbles—10 to 20 percent
- Content of stones—0 to 5 percent

Formation of the Soils

Soil is that portion of the earth's surface that supports or is capable of supporting plant growth. Soil consists of unconsolidated, or loose, mineral and organic material as well as living organisms. The nature of the soil at a given site is the result of the interaction of five general factors: parent material, climate, living organisms, topography, and time. All of these factors interact to form soils. Differences among soils are caused by variations in one or more of these factors.

In this section, each soil forming factor will be discussed separately. These factors, however, interact to create the soil forming processes that result in a soil profile. These processes can be grouped into four general types: additions, removals, transfers, and transformations. An example of an addition is the accumulation of organic matter in the surface layer of a soil that formed under bluebunch wheatgrass, such as in the Wynhoff, Swakane, and Vanbrunt soils. An example of a removal is the leaching of soluble salts and other substances in solution from the soil profile. An example of a transfer is clay being moved by water and redeposited lower in the profile, forming an argillic horizon. Nicmar, Rendovy, and Sycreek soils have an argillic horizon. An example of a transformation is the reduction of iron under water-saturated conditions, resulting in gleying, or the gray color, of many poorly drained soils.

Parent Material

Parent material is the unconsolidated mineral and organic material that is acted on by soil forming processes. The physical and chemical properties of parent material have important effects on the formation of soil.

The soils in this survey area formed under a wide variety of parent materials, including residuum and colluvium from granitic, metamorphic, sedimentary, metasedimentary, and volcanic rock; glacial deposits of till, glacial outwash, glaciofluvial sediments, and glaciolacustrine sediments; volcanic ash and pumice; loess; alluvium; and organic matter. Many of the soils formed in more than one kind of parent material. An example is the Manley series, which formed in volcanic ash over glacial till.

Residuum and Colluvium from Bedrock

There are five main groups of rock in the survey area: granitic, metamorphic, sedimentary, metasedimentary, and volcanic. Soils forming in these materials are typically associated with the ridges, shoulders, and upper backslopes where glacial till has not been deposited over the bedrock.

Granitic bedrock, including granodiorite, quartz monzonite, quartz diorite, trondhjemite, and granitic gneiss, is relatively extensive in the survey area. East of the Okanogan River, many of these areas are intrusive plutons that have pushed up through the metamorphic core complex. These different granitic rocks occur in a complex, intricate pattern but behave similarly in terms of soil formation.

In glaciated areas, the granitic bedrock has been scoured and abraded by glacial ice, which removed the weathered material, exposing hard, relatively unweathered rock. The soils are dominantly 10 to 60 inches deep, are in the loamy-skeletal family,

and have gravel- to boulder-sized rock fragments. Brevco, Devore, Swakane, and Vanbrunt soils are examples of soils that formed in this material.

In some areas, the glaciation was not as extensive, the granitic bedrock is commonly highly weathered, and the soils are 10 to 60 inches deep to a paralithic contact. The soils are in the sandy-skeletal or loamy-skeletal family with dominantly fine gravel-size rock fragments. McKay and Wellsfar soils are examples of soils that formed in this material.

Metamorphic rock, which includes gneiss and orthogneiss, is massive and relatively resistant to weathering. Soils forming in material derived from gneiss have a large content of angular rock fragments in the profile and a lithic contact. The soils are 10 to 60 inches deep to bedrock. Bromas and Storer soils are examples of soils that formed in this material.

Metasedimentary rock, which includes layer metamorphics and some schists, has layered bedding plains and is less resistant to weathering. Soils forming in material derived from this type of rock have rock fragments in the profile and are more weathered and easily broken. The soils are 10 to 60 inches deep to bedrock and are in the loamy-skeletal family. Finney, Rufus, and Wynhoff soils are examples of soils that formed in this material.

Sedimentary rocks in the survey area are mostly confined to a major subsidence feature known as the Methow-Pasayten graben (Barksdale, 1975). These rocks include arkose sandstone, shales, and conglomerate of the Goat Peak, Panther Creek, Harts Pass, Virginian Ridge, and Winthrop Sandstone Formations and volcanic rock (andesite flows, breccias, and tuffs) of the Newby Group and Midnight Peak Formations. Soils forming in the arkose sandstone tend to be more resistant to weathering, have angular rock fragments in the profile, and have lithic contact with the bedrock. Radercreek, Winsand, and Santop soils are examples of soils that formed in this material. Soils forming in shales have higher clay content and have channery rock fragments throughout the profile. The soils are 10 to 40 inches deep to bedrock and are in the loamy-skeletal family. Banker and Shermount soils are examples of soils that formed in this material.

Volcanic rock in the survey area includes andesite flows, breccias, rhyolite, and tuffs of the Newby Group and Midnight Peak Formation and rhyolite flows, andesite, dacite, tuffs, and breccias of the Klondike Mountain and Sanpoil Volcanic Formations. Soils forming in material weathered from these rocks are 4 to 40 inches deep to bedrock. These soils are mainly in the loamy-skeletal family and are associated with rock outcrop. Baldknob, Midpeak, Oxerine, Thout, and Volmont soils are examples of soils that formed in this material.

Glacial Deposits

During the Pleistocene Epoch, the Okanogan Lobe of the Cordilleran Ice Sheet covered most of the survey area, except for some of the very highest peaks. Glacial drift, consisting largely of till on footslopes and lower to mid backslopes and outwash gravel on valley floors and terraces dominates the survey area. Till consists of a mixture of sand, silt, clay, gravel, and boulders that have been ground up, carried, and deposited by glacial ice. The mineralogy of till is normally similar to that of the local bedrock. For example, soils forming in till from granitic rock have a substratum of very gravelly sandy loam and have very little clay in the profile. Soils forming in till from sedimentary and volcanic rock have more clay and sometimes form an argillic horizon. The substratum of most of these soils tends to be compacted and have a high bulk density due to the weight of the glacial ice. Most of the soils that formed in glacial till have a mantle of volcanic ash and some pumice. Manley, Nevine, and Newhorn soils are examples of soils that formed in granitic till with a mantle of volcanic ash. Ortellcreek soils formed in till from sedimentary and volcanic rocks with a mantle of ash.

Glacial outwash from melting glaciers developed on valley floors and terraces and on kames along drainages. Outwash consists mainly of sorted and stratified sand, gravel, and cobbles. Some terraces are mainly composed of nongravelly coarse-loamy materials that have been termed glaciofluvial deposits in the survey area. Most of the soils that formed in this material have a mantle of volcanic ash. The thickness of the mantle varies. Goddard, Granflat, Parmenter, Sitdown, and Wapal soils are examples of soils that formed in sandy-skeletal glacial outwash. Stapaloop and Wilder soils are examples of soils that formed in coarse-loamy and sandy glaciofluvial material.

Glaciolacustrine sediments are of limited extent in the survey area. Small glacial lakes formed when glaciers damned small side drainages. Glaciolacustrine sediments consist of stratified silt, clay, and sand and are in complex with glacial till. Martella soil is an example of a soil that formed in this material with a mantle of volcanic ash.

Volcanic Ash and Pumice

Two major eruptions in the Cascade Mountains deposited volcanic ash over most of the Okanogan National Forest. These were the eruptions of Glacier Peak in the North Cascades about 12,000 years ago and of Mount Mazama (Crater Lake) in the southern Oregon Cascades about 6,600 years ago. The eruptions of Glacier Peak deposited pumice and ash in a plume that covered an area in the southern part of the forest east of the ridge with Chelan County. This coarser ash has a texture of sandy loam and loamy sand and thins rapidly eastward. The eastern side of the survey area has volcanic ash from Mount Mazama. This ash has a finer particle-size and a texture of fine sandy loam and silt loam in some areas.

The physical characteristics of volcanic ash from the Mount Mazama eruptions include low bulk density (0.65 to 0.90), a dominance of silt and very fine sand-sized particles, weak structural development, and relatively high available water capacity (0.16 to 0.20 inches/inch). Chemical properties include high ratios of 15-bar water content and cation-exchange capacity to measured clay and a sodium fluoride pH greater than 9.4.

On northerly aspects at elevations above about 2,000 feet, the ash forms a discrete mantle over a variety of parent materials. Nevine, Manley, and Wilma soils are examples of soils in such areas. On southerly aspects below 2,000 feet, the ash commonly occurs as a component of the surface layer of the soil and is mixed with loess or the underlying parent material. Examples of soils with such a surface layer are Merkel, Republic, Brevco, and Coxit soils.

Alluvium

The major streams in the survey area and many of the secondary streams formed flood plains and stream terraces composed of recent alluvium. The character of the alluvium depends on the velocity and volume of the floodwaters and on the character of the soils and geology of adjacent uplands. Because of variations in the velocity of the floodwater during deposition, soils forming in alluvium commonly have profiles with stratified sandy loam, loamy sand, and sand. Aquandic Xerofluvents and Cryofluvents are examples of higher category soils that formed in alluvial deposits. Alluvial fans are common where relatively steep-sided drainages emerge onto nearly level valley bottoms or terraces. Buttoncreek and Jimbluff soils are examples of soils that are in the loamy-skeletal family and that formed on alluvial fans.

Organic Material

The organic soils in the survey area are on valley bottoms and drainage bottoms and in drainage basins. The parent material for organic soils is composed of organic matter from water-tolerant plants in various stages of decomposition. Organic soils commonly contain thin strata of volcanic ash and overlie alluvium, till, or outwash. Haplosaprists and Cryohemists are examples of higher category soils that formed in

organic material. Histic Cryaquepts are an example of a higher category soil that has a thin organic surface over alluvium or till.

Climate

Precipitation and temperature are the primary climatic factors affecting soil formation. The physical, chemical, and biological processes of soil formation are all dependent on temperature and moisture. These processes include weathering of minerals, production and decomposition of organic matter, erosion of soil, and movement of minerals and nutrients in and out of the soils. The rates at which these processes occur are influenced by soil temperature and moisture.

The climate in the survey area is strongly influenced by the rain shadow effect of the Cascades Mountains. At the west side of the survey area near the crest of the Cascade Mountains, the average annual precipitation is about 90 inches. Near the city of Winthrop, the precipitation decreases to about 11 inches. Temperatures are lower in the mountains and higher in the valleys. The average annual temperature ranges from about 35 degrees F in the mountains to about 52 degrees F in the valleys. Generally, the average annual air temperature decreases and precipitation increases with increasing elevation.

Six broad climatic zones are recognized for purposes of soil classification within the survey area. These zones are defined in terms of soil moisture regime, soil temperature regime, and dominant plant community.

Zone 1

This is the warmest and driest zone in the survey area. The soils have a xeric moisture regime and a mesic temperature regime. Annual precipitation ranges from 11 to 15 inches. Elevations generally range from 1,300 to 3,500 feet. The average annual air temperature is 46 to 52 degrees F. The frost-free period is 110 to 150 days. Vegetation is dominantly bunchgrass/shrub with uncommon, widely spaced ponderosa pine. Soils in this zone have a well developed mollic epipedon. Carbonates have been leached to deeper than 30 inches, except in soils with restricted permeability. Most of the soils have a well developed cambic horizon. The Conconully soils are an example of the soils in this zone.

Zone 2

This zone has forested and rangeland soils, and the average annual precipitation ranges from 14 to 20 inches. The soils have a xeric moisture regime and a mesic temperature regime. The average annual air temperature ranges from 45 to 50 degrees F. The frost-free period is 90 to 130 days. Elevations range from 1,800 to 4,600 feet. Vegetation is dominantly ponderosa pine with Douglas-fir in microsites and an understory of grasses, forbs, and shrubs. Above 4,000 feet, the soils tend to be on steep, open, dry, south-facing slopes. Most of the soils in this zone have a well developed cambic horizon and a mollic epipedon. Carbonates have been leached to deeper than 60 inches, except in some soils with restricted permeability. Donavan, Peka, and Vanbrunt soils are examples of soils that have a well developed cambic horizon. The Springdale soils are an example of soils with an ochric epipedon. The rangeland soils in this zone are in a mosaic with the forested soils and are typically shallow to bedrock. The Swakane soils are an example of shallow rangeland soils.

Zone 3

This zone is slightly cooler than zone 2, has forestland soils, and receives an average annual precipitation of 17 to 24 inches. The soils have a xeric moisture regime and a frigid temperature regime. Elevations range from 2,000 to 5,500 feet. The average annual air temperature ranges from 39 to 46 degrees F. The frost-free period is 90 to 120 days. Vegetation is dominantly Douglas-fir, western larch, and ponderosa

pine with an understory of grasses, forbs, and shrubs. The surface horizons of these soils have a high content of organic carbon (1 to 4 percent), but most are too light in color to be considered mollic. Examples of these soils are Merkel, Nevine, and Longort soils. Those soils having a mollic epipedon are typically on southerly aspects and at lower elevations. Chumstick, Mineral, Republic, and Pelican soils are examples.

Zone 4

This zone has forested soils, and the average annual precipitation ranges from 25 to 40 inches. The soils have a xeric moisture regime and a cryic temperature regime. Elevations range from 3,400 to 6,800 feet. The average annual air temperature ranges from 37 to 43 degrees F. The frost-free period is 60 to 90 days. Vegetation is dominantly subalpine fir, Engelmann spruce, and lodgepole pine with an understory of shrubs and forbs. The surface horizons of these soils have a high content of organic carbon (1 to 4 percent), but most are too light in color or too thin to qualify as a mollic or umbric epipedon. Many of the soils in this zone have andic soil properties with a cambic horizon that developed in the volcanic ash mantle. Myerscreek, Manley, and Gatewall soils are examples. The Crocamp soil is an exception. It developed under a grass/forb vegetative community and has an umbric epipedon. It typically is on south-facing slopes.

Zone 5

This zone is forested and is west of the Cascade crest. The average annual precipitation ranges from 50 to 70 inches. The soils have a udic moisture regime and a frigid temperature regime. Elevations range from 2,100 to 5,000 feet. The mean annual air temperature ranges from 40 to 43 degrees F. The frost-free period is 85 to 120 days. Vegetation is dominantly western hemlock, western red cedar, and Douglas-fir with an understory of shrubs and forbs. The soils in this zone have andic soil properties and a cambic horizon. They have a light-colored surface horizon and low base saturation. Typic Udivitrands, Andic Dystrudepts, and Vitrandic Dystrudepts are examples of higher category soils in this zone.

Zone 6

This zone is dominantly forested but has intermingled nonforested alpine slopes. It has the highest elevation and most moisture in the survey area. The soils have a udic moisture regime and a cryic temperature regime. The average annual precipitation ranges from 35 to 90 inches. Elevations range from 3,400 to 8,000 feet. The mean annual air temperature ranges from about 35 to 40 degrees F. The frost-free is 40 to 90 days. Vegetation is dominantly Pacific silver fir and mountain hemlock with an understory of shrubs and forbs. Typic Vitricryands and Andic Haplocryods typify the soils in this zone. Andic Haplocryods have a thick, slightly decomposed organic surface layer, a leached subsurface layer (albic horizon), and an accumulation of translocated organic matter, iron, and aluminum in the subsoil (spodic horizon). The soils formed in volcanic ash. Also in this zone are Humic Dystrocryepts and Humic Vitricryands on the nonforested alpine slopes. These soils have a low base saturation and a dark-colored surface (umbric epipedon).

Living Organisms

Living organisms are a vital factor in soil formation and a major defining characteristic of soil. Vegetation, microorganisms, and animals, including humans, influence the physical and chemical processes of soil formation.

Vegetation is the primary source of organic matter. The accumulation and decomposition of organic matter are responsible for the development of a dark “A” horizon in most rangeland soils and in some forested soils at lower elevations and for the development of an “O” horizon in most forested soils. Organic matter enhances

the fertility of soils by promoting better structure and stability, which is important for the movement of air and water. The available water capacity and cation-exchange capacity, or nutrient supplying potential, are increased by the addition of organic matter. Plants cycle nutrients through the soil. They also provide cover, which reduces the amount of runoff and the hazard of erosion. Plant roots improve aeration and permeability by increasing soil porosity.

Microorganisms decompose organic matter and are involved in the transformation of certain compounds and molecules within the soil. The elements involved include nitrogen, phosphorous, sulfur, and iron. Nitrogen mineralization and the fixation of atmospheric nitrogen involve microorganisms and provide nutrients for plant growth.

Roots mix the soil and help break up rocks and parent materials. Lichens, fungi, molds, and microorganisms aid in the chemical and physical weathering of rocks, soil particles, and primary minerals. The weathering process creates soils and soil fertility. Over long periods, however, the same process eventually destroys fertility as minerals are broken down and leached and eroded from the soil.

Earthworms, rodents, insects, and other burrowing animals accumulate and consume organic matter, which is then added to the soil. They constantly churn and mix the soil, aiding in the decomposition of organic matter and increasing soil aeration and permeability.

Human activities, such as timber harvesting and farming, greatly influence soil formation. Logging operations mix the duff into the surface layer, producing soils that have a thicker, darker colored surface layer than is present in adjacent undisturbed areas. Soils are compacted, displaced, and puddled by logging equipment, which alters the structure, porosity, and permeability of the soil. In addition, the construction of roads and landings alters normal drainage patterns and has the potential to accelerate erosion.

Topography

Topography, or relief, affects soil formation in several ways. Slope orientation, or aspect, affects the amount of solar radiation received at a given site. Solar radiation influences soil temperature and evapotranspiration. South-facing slopes receive more solar radiation than north-facing slopes and are therefore warmer and dryer. West- and east-facing slopes receive the same amount of sun. West-facing slopes, however, receive the sun later in the day, after the earth has warmed and begun to radiate heat. Therefore, they tend to be warmer and dryer than east-facing slopes. Soils on north aspects have a denser vegetative cover and a higher content of organic matter than soils on south-facing slopes and are thereby provided with better protection from erosion. This protection results in increased soil depth and, in drier climates, a thicker mantle of volcanic ash. On south aspects, the soils have sparser vegetation and higher rates of erosion, resulting in shallower soils and more mixing of the volcanic ash mantle with the underlying parent material.

In mountainous topography, the soils on ridges, shoulders, and upper backslopes tend to be shallower to bedrock than the soils on lower backslopes and footslopes. They are shallower because erosion and colluvial action, such as soil creep and landslides, move soil farther downslope. Steepness of slope has a strong influence on soil formation. Soils on steep slopes commonly have minimal profile development because the rate of removal of soil material by water erosion and mass movement is nearly as great as the rate of soil development. The Wellie soils are found only on steep slopes that show evidence of mass movement and consequently have virtually no soil development beyond a thin A horizon. Given sufficient time, soils on more stable, gently sloping to steep topography are normally well developed. The rate of erosion in such areas is much slower than the rate of soil formation. The Nahahum soils are examples of soils that are in such areas and have an argillic horizon.

Time

The weathering of rock and minerals and the development of soil horizons are time dependent. The longer a soil has been exposed to soil forming factors the more developed it becomes.

The glaciers retreated about 12,000 to 14,000 years ago. The first layers of volcanic ash from Mount Mazama and Glacier Peak were deposited on the landscape about 6,600 and 12,000 years ago, respectively. Soils forming in glacial till with a mantle of volcanic ash are, therefore, relatively young soils. They have developed a cambic horizon and have andic soil properties. Newhorn, Nevine, and Manley soils are examples of soils forming in volcanic ash over glacial till. In some areas that have higher precipitation, soils forming in volcanic ash over glacial till have developed a spodic horizon in the volcanic ash. Andic Haplocryods are an example of a higher category soil with a spodic horizon.

In this survey area, the development of soil horizons is more pronounced in the stable landscape positions. Nahahum and Cubhill soils are examples of soils that have had sufficient time to form an argillic horizon.

The hardness of the bedrock and the character of soil rock fragments are also time dependent. Some soils, such as Brevco and Devore soils, formed over hard bedrock after the glacier scoured away the weathered granite. The rock fragments in these soils are a product of more recent weathering. They tend to be larger and have a greater percentage of cobbles and stones. Some soils, such as Bromas and Wellsfar soils, formed in areas that were not scoured down to hard bedrock and are underlain by highly weathered granite, or grus. As a result, the rock fragments in these soils have been weathered over a longer period of time. They tend to be smaller and have a lesser percentage of cobbles and stones.

None of the soils in the survey area show a strong degree of soil development. Even those soils that formed in nonglacial material have experienced enough colluvial movement to retard the soil forming processes and the development of strong soil structure. Most of the soils have only had time to develop a cambic horizon or mollic epipedon.

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Glossary

Many of the terms relating to landforms, geology, and geomorphology are defined in more detail in the “National Soil Survey Handbook” (available in local offices of the Natural Resources Conservation Service or on the Internet).

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, relatively permeable earthy material deposited during the downwasting of nearly static glacial ice, either contained within or accumulated on the surface of the glacier.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

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.

Albic horizon. An eluvial horizon that is at least 1 centimeter thick and contains more than 85 percent albic materials. The color of the soil material is largely determined by the primary sand and silt particles rather than by their coatings.

Alluvial cone. A semiconical type of alluvial fan having very steep slopes. It is higher, narrower, and steeper than a fan and is composed of coarser and thicker layers of material deposited by a combination of alluvial episodes and (to a much lesser degree) landslides (debris flow). The coarsest materials tend to be concentrated at the apex of the cone.

Alluvial fan. A low, outspread mass of loose materials and/or rock material, commonly with gentle slopes. It is shaped like an open fan or a segment of a cone. The material was deposited by a stream at the place where it issues from a narrow mountain valley or upland valley or where a tributary stream is near or at its junction with the main stream. The fan is steepest near its apex, which points upstream, and slopes gently and convexly outward (downstream) with a gradual decrease in gradient.

Alluvium. Unconsolidated material, such as gravel, sand, silt, clay, and various mixtures of these, deposited on land by running water.

Alpine. Characteristic of, or resembling, the European Alps or any lofty mountain or mountain system, especially one so modified by intense glacial erosion as to contain cirques, horns, etc. In this survey, it is used to designate areas near or above timberline.

Andesite. A fine-grained volcanic rock consisting mainly of plagioclase feldspar with small amounts of pyroxene, hornblende, or biotite. It is dark colored, mainly shades of gray or green.

Andic soil properties. A collection of physical and chemical properties that form the criteria for the Andisol order. The properties are described in detail in the “Keys to Soil Taxonomy” (Soil Survey Staff, 2003).

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Arkrose. Sandstone containing unaltered feldspar, typically formed in mountainous regions from weathered granite.

Ash (volcanic). Unconsolidated, pyroclastic material that is less than 2 millimeters in all dimensions.

Ashy. Soils in which 60 percent or more of the entire soil, by weight, is volcanic ash, cinders, and pumice and less than 30 percent, by volume, is 2 millimeters in diameter or larger.

Aspect. The direction toward which a slope faces. Also called slope aspect.

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
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Avalanche chute. The central channel-like corridor, scar, or depression along which an avalanche has moved. It may take the form of an open path in a forest, with bent and broken trees, or an eroded surface marked by pits, scratches, and grooves.

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Backswamp. A flood-plain landform. Extensive, marshy or swampy, depressed areas of flood plains between natural levees and valley sides or terraces.

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.

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 (geomorphology). 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 plane. A planar or nearly planar bedding surface that visibly separates each successive layer of stratified sediment or rock (of the same or different lithology) from the preceding or following layer; a plane of deposition. It commonly marks a change in the circumstances of deposition and may show a parting, a color difference, a change in particle size, or various combinations of these. The term is commonly applied to any bedding surface, even one that is conspicuously bent or deformed by folding.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

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.

Bottom land. An informal term loosely applied to various portions of a flood plain.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Breccia, volcanic. A more or less indurated rock consisting mainly of coarse angular volcanic ejecta in a matrix of fine tuff.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Bulk density. The mass of soil per unit of volume. Moist bulk density is determined by weighing the soil when it is oven-dry and measuring volume when the it is at or near field moisture capacity.

Butte. An isolated, generally flat-topped hill or mountain with relatively steep slopes and talus or precipitous cliffs and characterized by summit width that is less than the height of bounding escarpments; commonly topped by a caprock of resistant material and representing an erosion remnant carved from flat-lying rocks.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Cambic horizon. A mineral soil horizon that is loamy very fine sand or finer textured and has soil structure rather than rock structure. The cambic horizon contains some weatherable minerals, and it is characterized by alterations or removals as indicated by mottling or gleying, stronger chroma or redder hue than in underlying horizons, or removal of carbonates.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Canyon. A long, deep, narrow valley with high, precipitous walls in an area of high local relief.

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.

Carbonates. Chemical compounds containing the carbonate ion (CO_3^{-2}) in combination with bases, such as calcium, magnesium, potassium, and sodium.

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.

Cement rock. Shaly limestone used in the manufacture of cement.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Cirque. A steep-walled, semicircular or crescent-shaped, half-bowl-like recess or hollow, commonly situated at the head of a glaciated mountain valley or high

on the side of a mountain. It was produced by the erosive activity of a mountain glacier. It commonly contains a small, round lake (tarn).

Clastic. Pertaining to rock or sediment composed mainly of fragments derived from preexisting rocks or minerals and moved from their place of origin. The term indicates sediment sources that are both within and outside the depositional basin.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. See Redoximorphic features.

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.

Climax forest stage. The culminating stage of plant succession for a forest site. The overstory vegetation is dominated by climax trees. Vertical depth of the understory and overstory canopies is at a maximum. Trees range from seedlings to maximum-sized mature trees and are present in varying amounts, resulting in an uneven-aged stand.

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.

Climax tree. The most competitive tree capable of growing on a particular site. In this survey area, the most competitive coniferous tree normally is the most shade-tolerant species and can reproduce in closed stand conditions.

Coarse-loamy. A loamy particle-size class that is at least 15 percent fine sand or coarser, including fragments as much as 3 inches in diameter, and that is less than 18 percent clay in the fine-earth fraction.

Coarse-silty. A loamy particle-size class that is less than 15 percent fine sand or coarser, including fragments as much as 3 inches in diameter, and that is less than 18 percent clay in the fine-earth fraction.

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.

COLE (coefficient of linear extensibility). See Linear extensibility.

Colluvium. Unconsolidated, unsorted earth material being transported or deposited on side slopes and/or at the base of slopes by mass movement (for example, direct gravitational action) and by local, unconcentrated runoff.

Compaction. The increase in soil bulk density as a result of applied loads or pressure. Compaction reduces porosity, water infiltration, and root penetration.

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. See Redoximorphic features.

Conglomerate. A coarse grained, clastic sedimentary 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.

Coniferous. Pertaining to plants of the Coniferales order of the Gymnospermae subdivision. Coniferous plants have cone fruit and are commonly, but not always, evergreen. Examples include ponderosa pine, Douglas-fir, and western larch.

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).

Continental glaciation. Refers to the glaciers that covered much of North America during the Ice Age, as opposed to contemporary glaciers associated with mountains.

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.

Cordilleran Ice Sheet. The glacial ice sheet that covered much of the northern half of North America, from the eastern face of the Rocky Mountains to the Pacific Ocean, during the Pleistocene.

Corrosion (geomorphology). A process of erosion whereby rocks and soil are removed or worn away by natural chemical processes, especially by the solvent action of running water, but also by other reactions, such as hydrolysis, hydration, carbonation, and oxidation.

Corrosion (soil survey interpretations). Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Cryic. A soil temperature regime in which the mean annual soil temperature at a depth of 20 inches ranges from 33 to 46 degrees F. The mean summer soil temperature is less than 47 degrees for soils that have an O horizon.

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.

Densic material. A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. Generally, the thickness of the soil over bedrock or some other root-restricting layer. Very deep soils are more than 60 inches deep; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Diorite. A coarse-grained igneous rock consisting mainly of plagioclase but with smaller amounts of hornblende, biotite, and pyroxene. Quartz is absent or sparse. (See Quartz diorite.)

Dip slope. A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. A general term for a course or channel along which water moves in draining an area. A term restricted to relatively small, linear depressions that at

some time move concentrated water and either do not have a defined channel or have only a small defined channel.

Drift. A general term applied to all mineral material (clay, silt, sand, gravel, and boulders) transported by a glacier and deposited directly by or from the ice or transported by running water emanating from a glacier. Drift includes unstratified material (till) that forms moraines and stratified deposits that form outwash plains, eskers, kames, varves, and glaciofluvial sediments. The term is generally applied to Pleistocene glacial deposits in areas that no longer contain glaciers.

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.

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.

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.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion surface. A land surface shaped by the action of erosion, especially by running water.

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. Most commonly applied to cliffs produced by differential erosion. Synonym: scarp.

Extrusive rock. Igneous rock derived from deep-seated molten matter (magma) deposited and cooled on the earth's surface.

Fan remnant. A general term for landforms that are the remaining parts of older fan landforms, such as alluvial fans, that have been either dissected or partially buried.

Fault. A fracture or fracture zone of the earth with displacement along one side in respect to the other.

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 ovendry 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*.

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine-loamy. A loamy particle-size class that is at least 15 percent fine sand or coarser, including fragments as much as 3 inches in diameter, and that is 18 to 34 percent clay in the fine-earth fraction.

Fine-silty. A loamy particle-size class that is less than 15 percent fine sand or coarser, including fragments as much as 3 inches in diameter, and that is 18 to 34 percent clay in the fine-earth fraction.

Fine textured soil. Sandy clay, silty clay, or clay.

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. The nearly level plain that borders a stream and is subject to flooding unless protected artificially.

Flood-plain landforms. A variety of constructional and erosional features produced by stream channel migration and flooding. Examples include backswamps, flood-plain splays, meanders, meander belts, meander scrolls, oxbow lakes, and natural levees.

Flood-plain step. An essentially flat, terrace-like alluvial surface within a valley that is frequently covered by floodwater from the present stream; any approximately horizontal surface still actively modified by fluvial scour and/or deposition. May occur individually or as a series of steps.

Fluvial. Of or pertaining to rivers or streams; produced by stream or river action.

Foliated. Refers to metamorphic rock that exhibits parallel structure or layering.

Foothills. A region of steeply sloping hills that fringes a mountain range or high-plateau escarpment. The hills have relief of as much as 1,000 feet (300 meters).

Footslope. The concave surface at the base of a hillslope. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Frigid. A soil temperature regime in which the mean annual soil temperature at a depth of 20 inches ranges from 33 to 46 degrees F. The mean summer soil temperature is more than 47 degrees for soils that have an O horizon. The difference between the mean winter soil temperature and the mean summer soil temperature is more than 9 degrees F.

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.

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.

Glaciofluvial deposits. Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur in the form of outwash plains, valley trains, deltas, kames, eskers, and kame terraces.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are bedded 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.

Graben. An elongate, relatively depressed crustal unit or block that is bounded by faults on its long sides.

Granite. A coarse-grained igneous rock consisting mainly of quartz and feldspar. It has more orthoclase than plagioclase. (See Granodiorite.)

Granitic. Term generally applied to granite or granitelike rock. It is used when referring to granite, granodiorite, quartz monzonite, quartz diorite, diorite, and granitic gneiss.

Granitic gneiss. A crystalline, banded metamorphic rock of granitic composition.

Granodiorite. A coarse-grained igneous rock consisting mainly of quartz and feldspar. It has more plagioclase than orthoclase. (See Granite.)

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Ground water. Water filling all the unblocked pores of the material below the water table.

Grus. The fundamental products of in situ granular disintegration of granite and granitic rocks, dominated by intercrystal disintegration.

Habitat type. All land capable of producing a similar climax plant community.

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 slope (geomorphology). A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

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.

Hill. A generic term for an elevated area 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. Slopes are generally more than 15 percent. The distinction between a hill and a mountain is arbitrary and may depend on local usage.

Hillslope. A generic term for the steeper part of a hill between its summit and the drainage line, valley flat, or depression floor at the base of the hill.

Histic epipedon. A thin, organic soil horizon that is saturated with water at some time during the year unless it is artificially drained. This horizon is at or near the surface of a mineral soil.

Historic climax plant community. The plant community that was best adapted to the unique combination of factors associated with the ecological site. It was in a natural dynamic equilibrium with the historic biotic, abiotic, and climatic factors on its ecological site in North America at the time of European immigration and settlement.

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 horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties include depth to a seasonal high water table, the infiltration rate, and depth to a layer that significantly restricts the downward movement of water. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock. Rock that was formed by cooling and solidification of magma and that has not been changed appreciably by weathering since its formation. Major varieties include plutonic and volcanic rock (for example, 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.

Indurated. Refers to a hard, brittle consistency resulting from particles being held together by cementing substances, such as silica, calcium carbonate, and iron. An indurated layer can be broken by a sharp blow of a hammer.

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.

Intermittent stream. A stream, or reach of a stream, that does not flow year-round but that is commonly dry for 3 or more months out of 12 and whose channel is generally below the local water table. It flows only during wet periods or when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Intrusive rocks. Igneous rocks derived from molten matter (magmas) that invaded preexisting rocks and cooled below the surface of the earth.

Iron depletions. See Redoximorphic features.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.
Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.
Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.
Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.
Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.
Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.
Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.
Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame. A low mound, knob, hummock, or short irregular ridge composed of stratified sand and gravel deposited by a subglacial stream as a fan or delta at the margin of a melting glacier; by a supraglacial stream in a low place or hole on the surface of the glacier; or as a ponded deposit on the surface or at the margin of stagnant ice.

Knoll. A small, low, rounded hill rising above adjacent landforms.

Ksat. See Saturated hydraulic conductivity.

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 nearly level surface marking the floor of an extinct lake filled by well sorted, generally fine textured, stratified deposits, commonly containing varves.

Lake terrace. A narrow shelf, partly cut and partly built, produced along a lakeshore in front of a scarp line of low cliffs and later exposed when the water level falls.

Landslide. A general, encompassing term for most types of mass movement landforms and processes involving the downslope transport and outward deposition of soil and rock materials caused by gravitational forces; the movement may or may not involve saturated materials. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Leaching. The removal of soluble material from soil or other material by percolating water.

Limestone. Sedimentary rock consisting mainly of calcium carbonate ($CaCO_3$).

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-skeletal. A particle-size class in which rock fragments 2 millimeters in diameter or larger make up 35 percent or more of the volume. The fine-earth fraction is loamy.

Loess. Material transported and deposited by wind and consisting dominantly of silt-sized particles.

Low strength. The soil is not strong enough to support loads.

Mass movement. A generic term for the dislodgment and downslope transport of soil and rock material as a unit under direct gravitational stress.

Masses. See Redoximorphic features.

Meander belt. The zone within which migration of a meandering channel occurs; the flood-plain area included between two imaginary lines drawn tangential to the outer bends of active channel loops.

Meander scar. A crescent-shaped, concave or linear mark on the face of a bluff or valley wall, produced by the lateral erosion of a meandering stream that impinged upon and undercut the bluff.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mesic. A soil temperature regime in which the mean annual temperature at a depth of 20 inches ranges from 47 to 58 degrees F. The difference between the mean winter soil temperature and the mean summer soil temperature is more than 9 degrees F.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement at depth in the earth's crust. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Miscellaneous area. A kind of map unit that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Moisture-control section. The layer within a soil profile used to determine the soil moisture regime. The upper boundary is the depth to which a dry soil is moistened by 1 inch of water in 24 hours. The lower boundary is the depth to which a dry soil is moistened by 3 inches of water in 48 hours.

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. In terms of glacial geology, a mound, ridge, or other topographically distinct accumulation of unsorted, unstratified drift, predominantly till, deposited primarily by the direct action of glacial ice in a variety of landforms. Also, a general term for a landform composed mainly of till (except for kame moraines, which are composed mainly of stratified outwash) that has been deposited by a glacier. Some types of moraines are disintegration, end, ground, kame, 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. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mountain. A generic term for an elevated area of the land surface, rising more than 1,000 feet (300 meters) 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. Mountains are formed primarily by tectonic activity and/or volcanic action but can also be formed by differential erosion.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

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.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. See Redoximorphic features.

Nose slope (geomorphology). A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent. Nose slopes consist dominantly of colluvium and slope-wash sediments (for example, slope alluvium).

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.

Ochric epipedon. A surface horizon of mineral soil that is too light in color, too high in chroma, too low in organic carbon, or too thin to be a mollic, umbric, or histic epipedon.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash. Stratified and sorted sediments (chiefly sand and gravel) removed or "washed out" from a glacier by meltwater streams and deposited in front of or beyond the end moraine or the margin of the glacier. The coarser material is deposited nearer to the ice.

Outwash plain. An extensive lowland area of coarse textured glaciofluvial material. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Outwash terrace. A valley train deposit extending along a valley downstream from an outwash plain or terminal moraine; a flat-topped bank of outwash with an abrupt outer face.

Overstory. The trees in a forest stand that form the upper crown cover.

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*.

Paralithic contact. A boundary between soil and coherent underlying material that can be dug with difficulty with a spade. The underlying material is referred to as weathered bedrock and has a cementation class of moderately cemented or weaker.

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.

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.

Plant association. A plant community that has reached the culmination of plant succession; a climax plant community.

Plant community. An assemblage of plants living together, reflecting no particular ecological status; a vegetative complex unique in its combination of plants.

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.

Pleistocene. The epoch of geologic time from approximately 10,000 to 2 million years ago. The earlier of the two epochs comprising the Quaternary period. Also called the Glacial epoch.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Pore linings. See Redoximorphic features.

Potential native plant community. See Climax plant community.

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.

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.

Pumice. A light-colored, vesicular, glassy pararock fragment. It is greater than 2 millimeters in diameter and commonly has the composition of rhyolite. It commonly has a specific gravity of less than 1.0 and is thereby sufficiently buoyant to float on water.

Pyroclastic. Pertaining to fragmental materials produced by usually explosive, aerial ejection of clastic particles from a volcanic vent.

Quartz diorite. A coarse-grained igneous rock consisting mainly of plagioclase with smaller amounts of quartz, hornblende, and biotite. (See Granodiorite.)

Quartz monzonite. A coarse-grained igneous rock consisting mainly of plagioclase, orthoclase, and quartz with minor amounts of biotite and hornblende. (See Granite and Granodiorite.)

Quaternary. The period of the Cenozoic Era of geologic time, extending from the end of the Tertiary Period (about 2 million years ago) to the present and comprising two epochs, the Pleistocene (Ice Age) and the Holocene (Recent).

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 as 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

Redoximorphic concentrations. See Redoximorphic features.

Redoximorphic depletions. See Redoximorphic features.

Redoximorphic features. Redoximorphic features are associated with wetness and result from alternating periods of reduction and oxidation of iron and manganese compounds in the soil. Reduction occurs during saturation with water, and oxidation occurs when the soil is not saturated. Characteristic color patterns are created by these processes. The reduced iron and manganese ions may be removed from a soil if vertical or lateral fluxes of water occur, in which case there is no iron or manganese precipitation in that soil. Wherever the iron and manganese are oxidized and precipitated, they form either soft masses or hard concretions or nodules. Movement of iron and manganese as a result of redoximorphic processes in a soil may result in redoximorphic features that are defined as follows:

1. Redoximorphic concentrations.—These are zones of apparent accumulation of iron-manganese oxides, including:
   A. Nodules and concretions, which are cemented bodies that can be removed from the soil intact. Concretions are distinguished from nodules on the basis of internal organization. A concretion typically has concentric layers that are visible to the naked eye. Nodules do not have visible organized internal structure; *and*
   B. Masses, which are noncemented concentrations of substances within the soil matrix; *and*
   C. Pore linings, i.e., zones of accumulation along pores that may be either coatings on pore surfaces or impregnations from the matrix adjacent to the pores.
2. Redoximorphic depletions.—These are zones of low chroma (chromas less than those in the matrix) where either iron-manganese oxides alone or both iron-manganese oxides and clay have been stripped out, including:
   A. Iron depletions, i.e., zones that contain low amounts of iron and manganese oxides but have a clay content similar to that of the adjacent matrix; *and*
   B. Clay depletions, i.e., zones that contain low amounts of iron, manganese, and clay (often referred to as silt coatings or skeletans).
3. Reduced matrix.—This is a soil matrix that has low chroma *in situ* but undergoes a change in hue or chroma within 30 minutes after the soil material has been exposed to air.

Reduced matrix. See Redoximorphic features.

Relief. The relative difference in elevation between the upland summits and the lowlands or valleys of a given region.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as bedrock disintegrated in place.

Rhyodacite. A fine-grained volcanic rock consisting mainly of quartz and feldspar. It has more plagioclase than orthoclase. Phenocrysts are common. Rhyodactite is the extrusive equivalent of granodiorite.

Riparian. Refers to areas adjacent to water or wetlands where the vegetation is dependent on water or where the use and management of the area directly impacts the water or wetland.

Riser. The vertical or steep side slope (for example, an escarpment) of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural, steplike landforms, such as successive stream terraces.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Rubble land. Areas that consist of cobbles, stones, and boulders, commonly at the base of mountains.

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.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sandy. A particle-size class in which the texture of the fine-earth fraction is sand or loamy sand but not loamy very fine sand or very fine sand; it is less than 35 percent rock fragments by volume.

Sandy-skeletal. A particle-size class that is 35 percent or more, by volume, rock fragments 2 millimeters in diameter or larger. The fine-earth fraction is sandy.

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.

Saturated hydraulic conductivity (Ksat). The ease with which pores of a saturated soil transmit water. Formally, the proportionality coefficient that expresses the relationship of the rate of water movement to hydraulic gradient in Darcy's Law, a law that describes the rate of water movement through porous media. Saturated hydraulic conductivity is commonly abbreviated as "Ksat." Terms describing saturated hydraulic conductivity are *very high*, 100 or more micrometers per second (14.17 or more inches per hour); *high*, 10 to 100 micrometers per second (1.417 to 14.17 inches per hour); *moderately high*, 1 to 10 micrometers per second (0.1417 inch to 1.417 inches per hour); *moderately low*, 0.1 to 1 micrometer per second (0.01417 to 0.1417 inch per hour); *low*, 0.01 to 0.1 micrometer per second (0.001417 to 0.01417 inch per hour); and *very low*, less than 0.01 micrometer per second (less than 0.001417 inch per hour). To convert inches per hour to micrometers per second, multiply inches per hour by 7.0572. To convert micrometers per second to inches per hour, multiply micrometers per second by 0.1417.

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.

Schist. A medium- to coarse-grained, foliated metamorphic rock in which the platy minerals are clearly visible. Micaceous minerals are commonly present.

Sedimentary rock. A consolidated deposit of clastic particles, chemical precipitates, or organic remains accumulated at or near the surface of the earth under normal low temperature and pressure conditions. Sedimentary rocks include consolidated equivalents of alluvium, colluvium, drift, and eolian, lacustrine, and marine deposits. Examples are sandstone, siltstone, mudstone, claystone, shale, conglomerate, limestone, dolomite, and coal.

Series, soil. A group of soils that have profiles that are almost alike. All the soils of a given series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock that formed by the hardening of a deposit of clay, silty clay, or silty clay loam and that has a tendency to split into thin layers.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shoulder. The convex, erosional surface near the top of a hillslope. A shoulder is a transition from summit to backslope.

Side slope (geomorphology). A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel. Side slopes are dominantly colluvium and slope-wash sediments.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

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.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

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.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief and by the passage of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Spodic horizon. An illuvial layer that is 85 percent or more spodic materials. This layer is dominated by active amorphous materials that are illuvial and are composed of organic matter and aluminum, with or without iron.

Stone line. In a vertical cross section, a line formed by scattered fragments or a discrete layer of angular and subangular rock fragments (commonly a gravel- or cobble-sized lag concentration) that formerly was draped across a topographic surface and was later buried by additional sediments. A stone line generally caps material that was subject to weathering, soil formation, and erosion before burial. Many stone lines seem to be buried erosion pavements, originally formed by sheet and rill erosion across the land surface.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream; represents the remnants of an abandoned flood plain, stream bed, or valley floor produced during a former state of fluvial erosion or deposition.

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 grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Talf. A geomorphic component of flat plains, such as lake plains, low coastal plains, or low-gradient till plains. It consists of an essentially flat (0 or 1 percent slopes), broad area dominated by closed depressions and a nonintegrated or poorly integrated drainage system. Precipitation tends to pond locally, and lateral transport is slow both above and below ground, favoring the accumulation of organic matter and the retention of fine-earth sediments. Better drained soils are commonly adjacent to drainageways.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terminal moraine. An end moraine that marks the farthest advance of a glacier. It typically has the form of a massive arcuate or concentric ridge, or complex of ridges, and is underlain by till and other types of drift.

Terrace (conservation). 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 (geomorphology). A steplike surface, bordering a valley floor or shoreline, that represents the former position of a flood plain, lake, or seashore. The term is usually applied both to the relatively flat summit surface (tread) that was cut or built by stream or wave action and to the steeper descending slope (scarp or riser) that has graded to a lower base level of erosion.

Tertiary. The period of geologic time from approximately 2 to 63 million years ago (radiometric dates). The earlier of the two geologic periods comprising the Cenozoic era.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”

Till. Dominantly unsorted and nonstratified drift, generally unconsolidated and deposited directly by a glacier without subsequent reworking by meltwater, and

consisting of a heterogeneous mixture of clay, silt, sand, gravel, stones, and boulders; rock fragments of various lithologies are embedded within a finer matrix that can range from clay to sandy loam.

Till plain. An extensive area of level to gently undulating soils underlain predominantly by till and bounded at the distal end by subordinate recessional or end moraines.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Tread. The flat to gently sloping, topmost, laterally extensive slope of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural steplike landforms, such as successive stream terraces.

Tuff. A generic term for any consolidated or cemented deposit that is 50 percent or more volcanic ash.

Udic. A soil moisture regime common to a climate having moisture throughout the year. The soils are dry for less than 45 consecutive days during the 4 months following the summer solstice.

Umbric epipedon. A thick, dark-colored, humus-rich surface horizon that has low base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Upland. An informal, general term for the higher ground of a region, in contrast with a low-lying adjacent area, such as a valley or plain, or for land at a higher elevation than the flood plain or low stream terrace; land above the footslope zone of the hillslope continuum.

Valley fill. The unconsolidated sediment deposited by any agent (water, wind, ice, or mass wasting) so as to fill or partly fill a valley.

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.

Volcanic ash. Uncemented material, consisting of fragments less than 4 millimeters in diameter, that was ejected from a volcanic vent.

Weathering. All physical disintegration, chemical decomposition, and biologically induced changes in rocks or other deposits at or near the earth's surface by atmospheric or biologic agents or by circulating surface waters but involving essentially no transport of the altered material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an oven-dry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

Xeric. A soil moisture regime common to a climate having moist winters and dry summers. The soils are dry in the moisture-control section for more than 45 consecutive days during the 4 months following the summer solstice and are moist for more than 45 consecutive days during the 4 months following the winter solstice.

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