SOIL RESOURCE INVENTORY

DESCHUTES NATIONAL FOREST

Pacific Northwest Region

1976

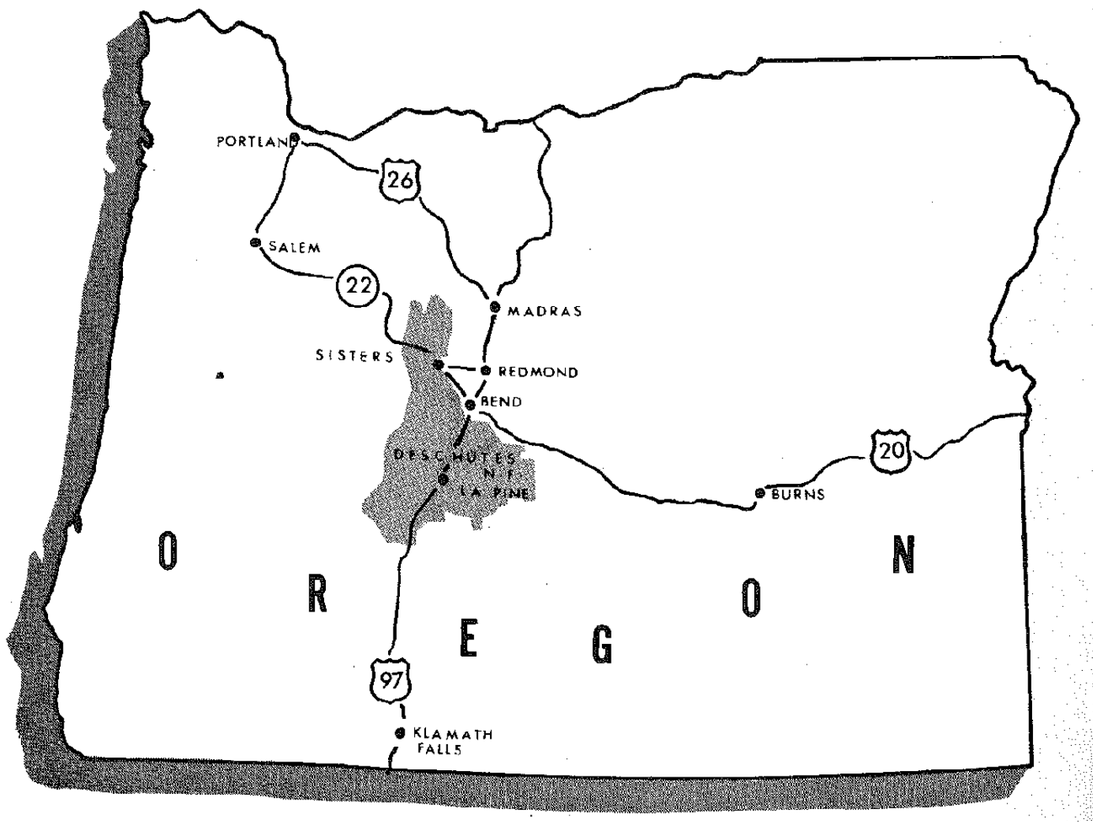
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Soil Scientist

DESCHUTES NATIONAL FOREST

VICINITY MAP



PREFACE

This Soil Resource Inventory of the Deschutes National Forest was made to provide some basic soil, geology, and landform information for management interpretations. The inventory is part of the Regional soils program developed by the Soil Management Group of the Division of Watershed Management to assist Forest Land Managers in applying multiple-use principles.

The objective of this Soil Resource Inventory is to provide soils information in a form useful to the land manager as an aid to multiple-use management as directed by Public Law 86-517. This law states that the National Forests are to be administered to achieve and maintain in perpetuity a high level of annual or regular periodic output of the various renewable resources of the National Forests without impairment of the productivity of the land.

All renewable surface resources of the National Forest are dependent upon soil, which is essentially a nonrenewable resource. Soils develop at a slow rate. This fact necessitates conservation, wise use, and preservation of this basic resource in order to produce high-level, sustained yields of quality water, timber, recreation, wildlife, and livestock forage. To accomplish sustained yield of renewable resources to conserve or preserve the soil resource while making wise use of this resource, it is necessary to have basic soils information and to make sound management interpretations.

The Soil Resource Inventory consists of two documents. The first part is the main body of the report and the second part is the Atlas of Soil Maps. The maps in the Atlas are at a scale of 1:64,000 (one-inch per mile), which is the scale at which the field mapping was conducted. Soil maps are also presented in Appendix J at a reduced scale of a half-inch per mile for general reference purposes.

Field mapping was conducted from April 1972 through September 1974 by Soil Scientists, Daniel M. Larsen and Robert A. Klink. Technical supervision was provided by Loren Herman. The area mapped includes all lands within the boundary of the Deschutes National Forest.[1/].

During the course of the inventory and preparation of this report, valuable assistance, advice, and cooperation received from Forest and Regional personnel was sincerely apprcciated. Appreciation and credit is also extended to other Soil Scientists for ideas expressed in Soil Resource Inventories written prior to this document and adapted for use herein.

1/ Reference to the Deschutes National Forest, or the Forest, within this report includes all land within the boundary and is not limited to Forest Service ownership.

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I INTRODUCTION

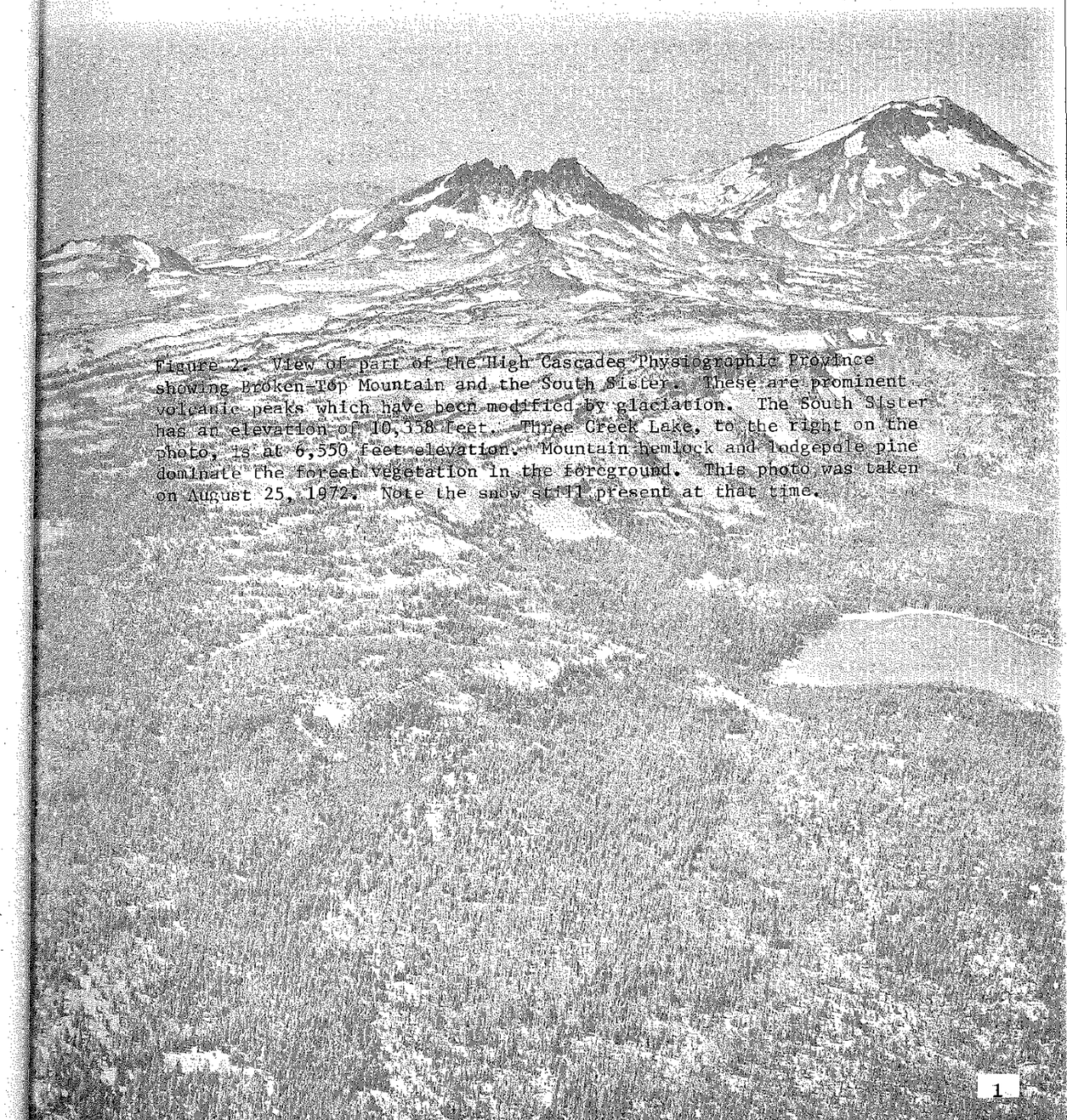


Figure 2. View of part of the High Cascades Physiographic Province showing Broken-Top Mountain and the South Sister. These are prominent volcanic peaks which have been modified by glaciation. The South Sister has an elevation of 10,358 feet. Three Creek Lake, to the right on the photo, is at 6,550 feet elevation. Mountain hemlock and lodgepole pine dominate the forest vegetation in the foreground. This photo was taken on August 25, 1972. Note the snow still present at that time.

This report is intended for use by anyone seeking basic information on soils and landforms of the Deschutes National Forest. There are many uses for this information, although it is not intended to answer detailed questions relating to soils. It is a basic inventory document containing information about the nature, distribution, and management of the soils. It should serve as a communications link between the Forest Soil Scientist and other Forest personnel, as well as a working tool for land managers.

The Soil Resource Inventory (SRI) has its primary use at the planning level. Soils, landforms, and bedrock characteristics are defined at an intensity sufficient to help develop resource management policies, guidelines, and basic plans. Due to the reconnaissance nature of this inventory, it lacks adequate detail for use in high-intensity, small-area projects. These projects normally require additional onsite study by various technical specialists, including a Soil Scientist.

Soil is a resource which has an effect on, and is affected by, most land management activities. Timber harvest, road construction, recreation area development, and many other activities have an effect on the soil resource to some degree. It is important for the land manager to thoroughly understand the effect of varions activities on the soil resource. It is equally important for the land manager to understand the capabilities of the soil resource. Basic soils information contained in this report will help the land manager and planners to: (1) determine the effects of management activities on the soil and water resources and (2) evaluate the capabilities and limitations of the soil for various uses.

Many of the terms used in this report may be new to the reader. A glossary is provided in Appendix I which gives definitions for many of the terms found herein. Reference should also be made to Appendix D and Appendix E for definitions of the elements in the soil information and interpretation tables.

The soil maps show the location and extent of the soils on the Deschutes National Forest. The user can locate an area of interest on the soil maps and note the mapping unit numbers that occur. Reference should then be made to the mapping unit descriptions found in this document, and then proceed to the tables which give basic soils information and interpretations for various management activities.

The reader should be familiar with the Table of Contents. Only by knowing what information is provided can the full value of this report be realized.

There is a wide variety of information presented on tables in this report. In some instances, it may be necessary to extract information from several tables to obtain the specific information and interpretations desired. A list showing how the information is organized on the tables is given below to assist the user in locating specific data:

1. LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES

Landform
Slope Range (%)
Mean Slope (%)
Broad Forest Type
Elevation
Annual Precipitation
Major Drainage Pattern and Intensity
Parent Materials
Depth to Buried Soil
Depth to Bedrock
Type of Bedrock Drainage Class
Infiltration Class
Root Distribution
    Size
    Abundance
    Depth
Remarks; Representative Area

2. VEGETATION CHARACTERISTICS OF LANDTYPES

Major Deschutes National Forest Ecoclass Identification Codes
Deschutes National Forest Ecoclass Mapping Codes
Total Vegetative Cover
Overstory
    Major Species
    Vegetative Cover - Percent
Understory
    Major Species
    Vegetative Cover - Percent
Ground Cover
    Major Species
    Vegetative Cover - Percent
Timber Site Species
Timber Site Index
Cubic Foot Site Class
Range Productivity

3. SOIL CHARACTERISTICS OF MODAL SITES

Location
Depth to Bedrock
Depth to Restrictive Layer
Litter Depth
Soil Layer and Thickness
Color
Texture
Rock Fragments

3. SOIL CHARACTERISTICS OF MODAL SITES (Continued)

- Size
- Shape
- Percent

Rock Fragment Class
Structure
- Grade
- Size
- Type

Cementation or Compaction
Permeability
Consistence
- Dry
- Moist
- Wet

pH
Estimated Taxonomic Classification
Remarks

4. BEDROCK CHARACTERISTICS

Type of Bedrock
Color (Fresh Surface)
Hardness
Degree of Fracturing
Fracture System
Fracture Surface
Competency
Remarks

5. EROSION AND HYDROLOGIC INTERPRETATIONS

Natural Stability
Nature of Mass Movement
Expected Mass Movement as a Result of Man's Activities
Surface Soil Erosion Potential
Subsoil Erosion Potential
Water Yield Class
Bedrock Hydrologic Characteristics
Hydrologic Group
Sedimentation Yield Potential
Expected Sediment Size

6. INTERPRETATIONS FOR TIMBER MANAGEMENT

Landtype Suitability for Timber Management
Susceptibility to Brush Competition
Susceptibility to Sedge or Grass Competition
Potential for Regeneration
Limitations to Regeneration
Suggested Tree Planting Species

7. SOIL AND WATER IMPACTS FROM VARIOUS TIMBER HARVEST METHODS

Impact from Tractor Logging
Type of Damage
Impact from Cable (No Suspension)
Type of Damage
Impact from Cable (Partial Suspension)
Type of Damage
Impact from Cable (Full Suspension)
Type of Damage
Impact from Aerial Logging
Type of Damage

8. INTERPRETATIONS FOR ENGINEERING

Unified Classification
Suitability for Use as Topsoil Source
Suitability for Sand and/or Gravel Source
Suitability as a Possible Clay Source
Suitability of Bedrock for Road Rock
Limitations of Bedrock for Road Rock
Considerations for Road Location and Construction
Method of Excavation
Cutbank and Ditch Erosion Potential
Susceptibility to Cutbank Sloughing and Raveling
Probability of Cutbank Failures
Suggestions for Cutbank Stability Problems
Failure Potential on Road Waste and Fills
Erosion Potential on Road Waste and Fills
Suitability of Road Waste and Fill Slopes to Seeding
Limitations to Road Waste and Fill Slope Seeding
Suitability of Cutbanks to Seeding
Limitations to Cutbank Seeding
Suggestions for Cutbank Seeding

9. INTERPRETATIONS FOR RECREATION

Landtype Suitability for Recreation Area Development
Landtype Limitations for Recreation Area Development
Treatment to Increase Suitability
Soil and Site Damage Susceptibility
Susceptibility to Dustiness
Susceptibility to Muddiness
Trail Suitability
Limitations for Trails
Considerations for Trail Improvements and Protection
Suitability for Sewage Filter Field
Soil Limitations for Sewage Filter Field Use

10. INTERPRETATIONS FOR RANGE MANAGEMENT

Suitability for Range Management
Limitations for Domestic Livestock Use
Susceptibility to Soil Compaction
Susceptibility to Soil Displacement
Potential for Range Improvement through Seeding
Limitations to Range Seeding

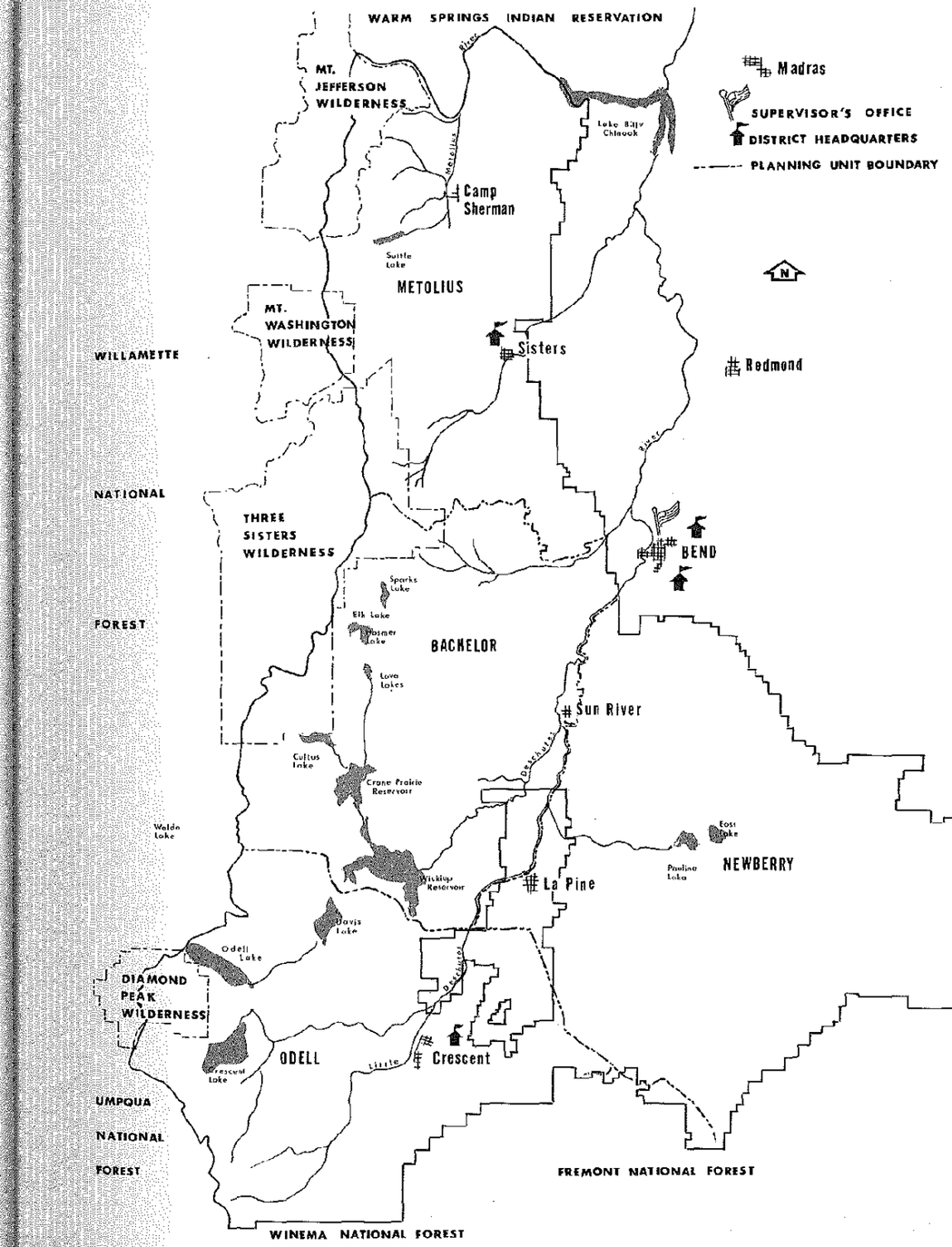
11. SOIL TEST RESULTS - CHEMICAL ANALYSIS

Landtype Number
Location
Depth
pH
Available Phosphorus
Extractable Potassium
Extractable Calcium
Extractable Magnesium
Total Bases
Soluble Salts
Organic Matter
Sulphate - Sulphur
Total Nitrogen

12. SOIL MOISTURE ANALYSIS (Selected samples)

Sample and Depth
Location
Bulk Density
Percent Coarse Fragments
Percent Soil Moisture (By Weight)
    0.1 Bar
    0.3 Bar
    15 Bar
Percent Soil Moisture (By Volume)
    0.1 Bar
    0.3 Bar
    15 Bar
Retention
Detention
Available Water (Inch/Foot)

FIGURE 3



DESCHUTES NATIONAL FOREST

II LOCATION AND LANDSCAPE OF THE DESCHUTES NATIONAL FOREST

The Deschutes National Forest lies east of the Cascade Crest in Central Oregon (see Figure 3) and has been shaped primarily by volcanic and glacial activity. It is located mostly within two physiographic provinces--the High Cascades and the High Lava Plains. Notable features are its snowcapped mountain peaks, clear lakes and streams, extensive pine forests, favorable climate, and youthful volcanic landforms.

The Forest ranges from the semiarid high desert to the alpine slopes of the Cascade Mountains. The climate may be characterized as having cold, moist winters and warm, dry summers. Annual precipitation in Bend is about 12 inches, but only 25 miles to the west, at the crest of the Cascades, it is 80 to 100 inches, mostly in the form of snow.

Following are some photographs showing some examples of various land characteristics. Reference should be made to Appendix A, B, and C for further explanation of the climate, vegetation, and geology of the Forest.

III SUMMARY OF SOILS ON THE DESCHUTES NATIONAL FOREST

Soil differences result from variations in one or more of the five "soil forming factors." These factors are parent material, climate, organisms (plant and animal life), topography, and time. The soil differences will be expressed basically in two ways: morphologically (what they look like) and by differences in management potentials or limitations.

Soil Materials

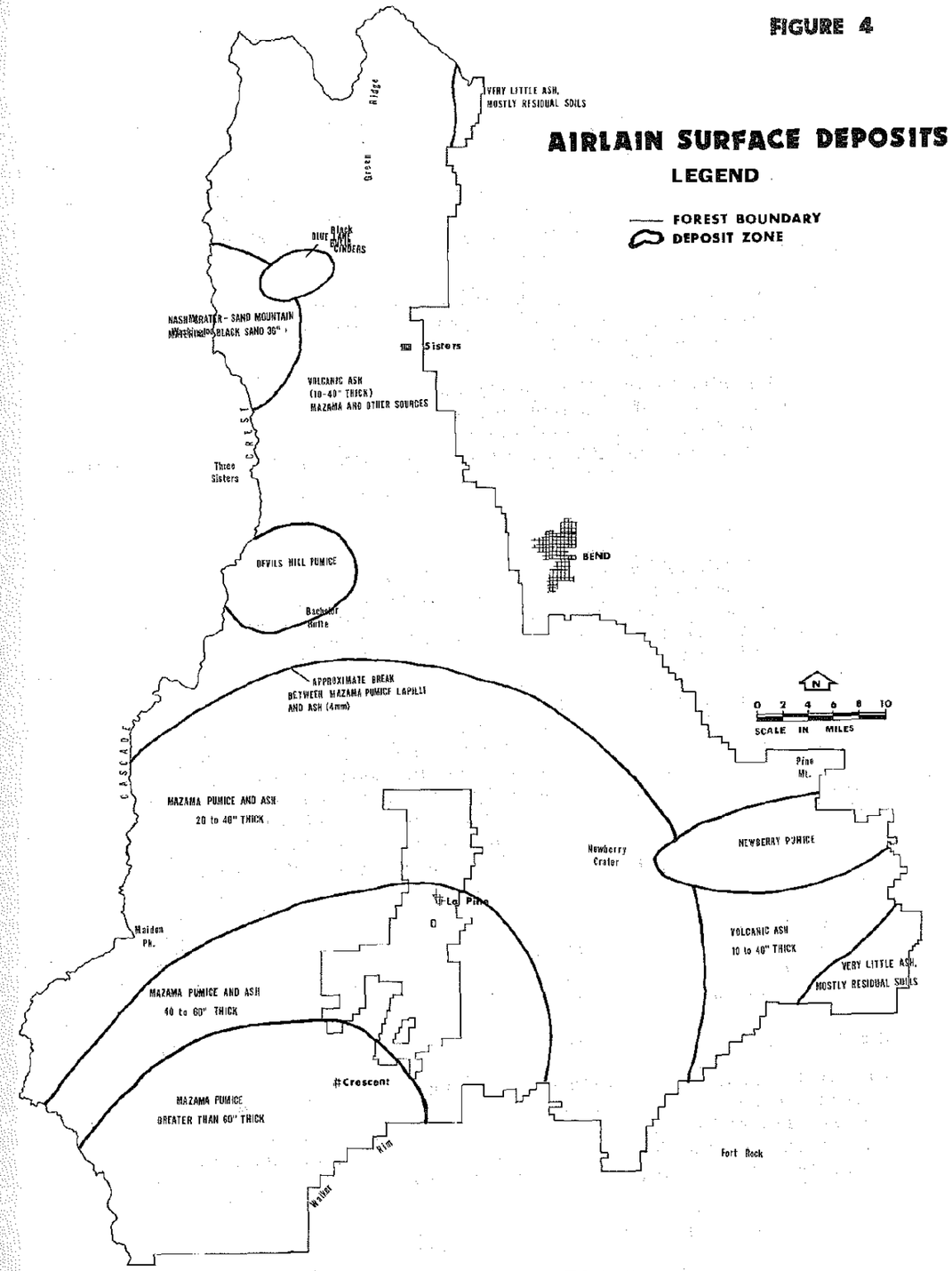
Soils in the area are influenced partially to entirely by materials deposited as a result of volcanic eruptions, including volcanic ash, pumice, and cinders. Figure 4 shows the general distribution of various ash and pumice deposits on the Deschutes National Forest. These materials fell upon previously developed soils that may be referred to as "buried soils," since they were essentially buried by the pumice, ash, or cinder deposits. The buried soils were formed from the older geologic materials, which include hard basalts and andesites, tuffs, breccias, glacial till, and glacial outwash. Practically all bedrock materials are extrusive volcanic rocks.

The most extensive soil material is airlain dacite pumice lapilli and volcanic ash from the eruption of Mount Mazama (Crater Lake) about 6,000 years ago. This material is about 12 feet thick on the south end of the Forest and extends northerly, becoming thinner and finer with distance from its source. Near Bend, this deposit is of a sand size and is between 12 and 30 inches thick. Some of the thicker deposits in any local area consist of some materials that have been redeposited after eroding from upslope positions.

Two other pumice deposits, which are younger and overlie the Mazama pumice, are materials called Newberry pumice and Devil's Hill pumice. These are both rhyolitic types, being more acid and lighter colored than the Mazama pumice. Very little volcanic ash is associated with these types of pumice lapilli, and the general particle size is about ½ to 2 inches in diameter. The Newberry pumice is about 20 feet thick near its source and extends easterly from Newberry Crater to the Forest boundary, where it is less than one foot in thickness. The Devil's Hill pumice centers around Devil's Hill, just north of Devil's Lake, and extends south to Elk Lake, east to Mt. Bachelor, and north to Green Lakes. Depths range from about three feet to a trace.

A black volcanic sand covers the area in the vicinity of the Santiam Pass and Mt. Washington. This material is very uniform in size and the source is believed to be from Sand Mountain and Nash Crater on the west side of the Cascade Crest. The material is over six feet thick in some locations near the crest and diminishes to about one foot in thickness just east of Suttle Lake, a distance of about seven miles. Its influence extends northward to the National Forest boundary.

FIGURE 4



Also, in the Suttle Lake vicinity, there is an area of about nine square miles which has been covered by a black cinder (scoria) deposit that had its source from the Blue Lake crater. These cinders are commonly ¼ to 1 inch in diameter and range from about six feet to one foot in thickness in the area designated in Figure 10. Near Suttle Lake, the cinders overlie the black sandy ash which overlies Mazama ash on a buried soil which formed from, and overlies, glacial till. This makes four layers of distinctly different parent materials.

Besides the pumice, volcanic ash, and cinder deposits mentioned above, there are many local deposits of volcanic ejecta near the many volcanoes and cinder cones on the Forest.

In a few locations along the eastern edge of the Forest, there is very little evidence of influence by volcanic ejecta, and the soils are basically of the residual type formed from bedrock. Textures on these soils are markedly finer than the pumice and ash soils that dominate the landscape.

Soil Morphology

Due to the young geologic age and similarity of soil parent materials on the Forest, the soils show relatively little morphological development compared to the fairly wide range of climatic and vegetation conditions. Greatest differences are related to the type of volcanic ejecta from which the soils have formed.

In horizon (soil layer) description terminology, a typical sequence above the buried soil is A1, AC, and C. At the upper elevations, where mountain hemlock occurs, a thin A2 horizon is commonly present. B horizons are practically nonexistent on the coarse-textured volcanic soils. The A1 horizons are typically very thin under Forest vegetation, with the AC and C horizons making up the major portion of the profile. On the coarse-textured pumice soils, there is typically a C1 and C2 horizon sequence, the C2 commonly being more sandy than the C1 material above.

Some of the soil mapping units have similar soil morphology. Differences in landform, slope, potential vegetation, and geology are also important for differentiating map units. These factors, together with soils, are important for land management interpretations.

Common Soil Features and Limitations

Some of the most common soils problems encountered on the Deschutes National Forest are related to the characteristics of the pumice soils and the climatic situation. These soils are coarse-textured, have low bulk densities, low fertility, and are light-colored. On upland positions, they are excessively to well-drained.

Soil displacement is one of the most readily recognized problems associated with pumice soils. The surface layers are easily removed by mechanical activity. This results in a high visual impact, with the exposure of the light-colored material, as well as having an impact on the nutrient distribution and soil surface protection by organic matter.

Soil erosion occurs primarily in the form of soil creep, sheet erosion, and dry ravel on the coarse-textured pumice soils. Gullies are confined mostly to finer textured soils or situations where concentrated runoff occurs. Surface runoff seldom occurs over the pumice soils for more than a short distance due to the rapid infiltration into the soil. There are times, however, when a frost layer is present and the soil above it becomes saturated and flows downslope (solifluction). This situation is common when snow melts. Wind erosion is a significant factor when mineral soil is exposed. Dustiness and erosion on unsurfaced roads are common problems throughout the area. Mass failures are not common on the Deschutes, but there are some areas where potentials do exist, particularly at the higher elevations.

As slope steepness increases, soil displacement and erosion problems tend to increase. Overall, the slopes on the Deschutes are quite gentle compared to the other Forests in Region 6. Steep slopes are usually associated with volcanic cones, glacial headwalls and moraines, and fault escarpments. Many of the steep slopes have a convex shape which poses some limitations to the layout of cable logging systems.

Stoniness is a problem over many acres of the Forest where lava flows of relatively young age are present. The most recent flows lack soil material and are barren of vegetation, while others have received a thin pumice and ash mantle which supports timber, but still the rough lavas dominate the surface features. Operability and reforestation by planting are limited on these sites.

Soil compaction and muddiness problems (during spring and winter) are evident on the soils at the northeast end of the Forest and in some locations along the eastern edge of the Fort Rock District where a volcanic ash or pumice surface is very thin or lacking, and the soils are finer textured than normal for the Deschutes National Forest. Compaction does occur with heavy activity on the pumice soils. This is not considered as a significant limitation on these coarse-textured soils, although more study is needed.

On many sites on outwash plains, there are permanent or periodic high water table conditions that limit the use of the areas for sewage filter fields. These sites can generally be identified by local vegetative indicators.

Short growing seasons, frost heaving, and droughtiness impair plant establishment and growth on some parts of the Forest. Cold temperatures, along with frost heaving, are problems at high elevations, on flats, and in dry depressions (frost pockets). Cold soils relate not

only to the climatic situation, but also to the low thermal conductivity of the soils. The inability of the soil to transfer heat readily creates a situation of surface temperature extremes and fairly uniform temperatures below about 10 inches.

Summers are typically moderately hot and dry, causing high daytime soil temperatures, especially on south aspects. High surface temperatures and droughtiness become more of a problem as the annual precipitation decreases. Surface soil temperatures as high as 164° F. were recorded in the course of this inventory. Approximately 140° F. is considered lethal to young seedlings.

The general nutrient status indicates that nitrogen, phosphorus, and sulphur are low, and potassium, calcium, and magnesium are high in most soils. These nutrients are concentrated in only the upper few inches of soil. Soil reaction is slightly acid to neutral in the pine forests. Under mountain hemlock, the surface is much more acid, and moderately alkaline conditions may be found under juniper and sagebrush.

Hydrophobic ("nonwettable" or "water repellent") surface soils are common. This condition is most noted under mountain hemlock and mixed conifer stands. There is a soil layer that is usually two to three inches thick and light grayish-brown in color that resists wetting by water. The condition appears to be discontinuous. Hydrophobic soils have increased surface runoff and plant establishment is often retarded. Often associated with the nonwettable soils is a tight mat of needles which also resists water penetration, but is important in keeping the soils from eroding.

IV DEFINITIONS OF MAPPING UNITS AND SPOT SYMBOLS FOUND ON THE SOILS MAPS

This section defines the mapping unit codes and spot symbols found on the soil maps.

The mapping unit designations consist of a two-digit code established for computer coding purposes. A number or a number-letter combination signifies a mapping unit which consists of at least 70 percent of a given landtype. A two-letter designation represents a complex mapping unit. There were 147 mapping units and 122 complexes identified on the Deschutes National Forest during the Soil Resource Inventory.

The basic unit of identification in the Soil Resource Inventory is called a landtype. A landtype is the basic taxonomic unit in this system and represents a definable land system in respect to the soil, vegetation, geology, topography, climate, and drainage situation. Management interpretations are different in some way on each landtype.

Some areas have soils that are too variable to be described by a typical profile description or are extremely variable in respect to other land features. These areas are referred to as miscellaneous landtypes and are described by a short narrative description.

Mapping units contain a dominant landtype which accounts for at least 70 percent of the mapping unit delineation. The dominant landtype of the mapping unit is described in the mapping unit description and identified by the same number as used for the mapping unit. Within the mapping unit, other landtypes occur. Those most commonly associated with the dominant landtype of the mapping unit are included in the descriptions as inclusion. These inclusions of other landtypes account for no more than 30 percent of the mapping unit.

Complex mapping units are mapping units used in areas where two or more defined landtypes are present in an arrangement too complex to separate at the one-inch per mile scale. Landtype components of each complex are given in the list of Complex Mapping Units. Where a complex composed of two landtypes occurs, the first component listed makes up 50 to 60 percent of the complex and the second makes up 40 to 50 percent. For a complex composed of three landtypes, each landtype makes up 30 to 40 percent of the complex, with the first listed generally being most common.

The first letter of the code for mapping unit complexes is somewhat conotative. Units starting with "G" are primarily on glacial deposits, "H" are at high elevations, "L" are on lavas, "M" are usually mixed materials such as bedrock and glacial deposits, "N" are on Newberry pumice, "P" are thick and very thick Mazama pumice deposits, "R" are residual soils, "S" are on black volcanic sands, "T" are on tuffs and breccias, "W" are wet soils, and "X" are on materials that are very complex or too variable to specify. This is only a system to serve as a guide, and there is some overlap. The second letter of the code has no conotative meaning.

For information and interpretations on complex mapping units, refer to each of the mapping unit components. For example, Mapping Unit MH is a complex of Landtypes 28 and 65. The user should refer to the descriptions and interpretations for Landtypes 28 and 65 to determine potentials and limitations of the area identified by Mapping Unit MH.

Spot symbols represent land features important to land management that are too small to delineate at the scale used for this inventory. The spot symbols found on the soil maps are listed below:


Rock Outcrop

T Talus

X Unstable Area


Wet Spot, Small Marsh, Pond


Slump or Slide Escarpment, Cirque Headwall


Avalanche Track or Debris Slide

Sand Spot, Sand "Blowout"

Small Crater

Cinder or Gravel Pit

Fault Escarpment or Rock Cliff

F Small Frost Pocket; mostly bare ground

V MAPPING UNIT DESCRIPTIONS

This section gives a description of each of the mapping units.

Mapping Units dominated by a miscellaneous landtype, such as Mapping Unit 1 through 15, are described by a brief paragraph.

Mapping units composed dominantly of a single standard landtype have a full page description consisting primarily of information about the dominant landtype. This includes information on landform, slope, elevation, precipitation, vegetation, productivity, soil characteristics, depth to bedrock, bedrock characteristics, and similarity to other landtypes.

The description for complex mapping units consists of a list of the landtypes found in each complex. Reference should be made back to the description of each of the components to determine the character of each complex.

MAPPING UNIT 1 - Barren Lava Flows

Mapping Unit 1 consists of 70 percent or more of Landtype 1 and may have inclusions of Landtypes 11, 74, 75, 76 and 77.

Landtype 1 consists of fresh lava flows barren of vegetation. Slopes are uneven and rugged. A volcanic ash or pumice soil is lacking on this landtype. Rock materials may include basalt, andesite, rhyolite, obsidian, or block pumice.

MAPPING UNIT 2 - High Elevation Drainages

Mapping Unit 2 consists of 70 percent or more of Landtype 2 and may have inclusions of Landtypes 5, 8 and 17.

Landtype 2 includes narrow draws, glacial valley floors, wet depressions, and drainages in the Upper Forest Zone. These are wet areas that generally support forest vegetation. Tree species consist of lodgepole pine, mountain hemlock, Engelmann spruce, and true firs. Slopes may range from nearly level up to about 50 percent. This landtype also includes seepy spots that occur under a forest canopy, and some very brushy sites with willow and alder at high elevations.

MAPPING UNIT 3 - Rocky Mountain Peaks

Mapping Unit 3 consists of 70 percent or more of Landtype 3 and may have inclusions of Landtypes 1, 13, 18 and 6.

Landtype 3 consists of high-elevation, rocky, mountain slopes and perennial snow and ice zones above timberline. Materials include basalts, andesites, rhyolites, breccias, tuffs, cinders, other pyroclastics, and fresh glacial deposits. Vegetation is lacking to extremely sparse. Slopes range from about 30 percent to nearly vertical walls.

MAPPING UNIT 4 - Alpine Meadows

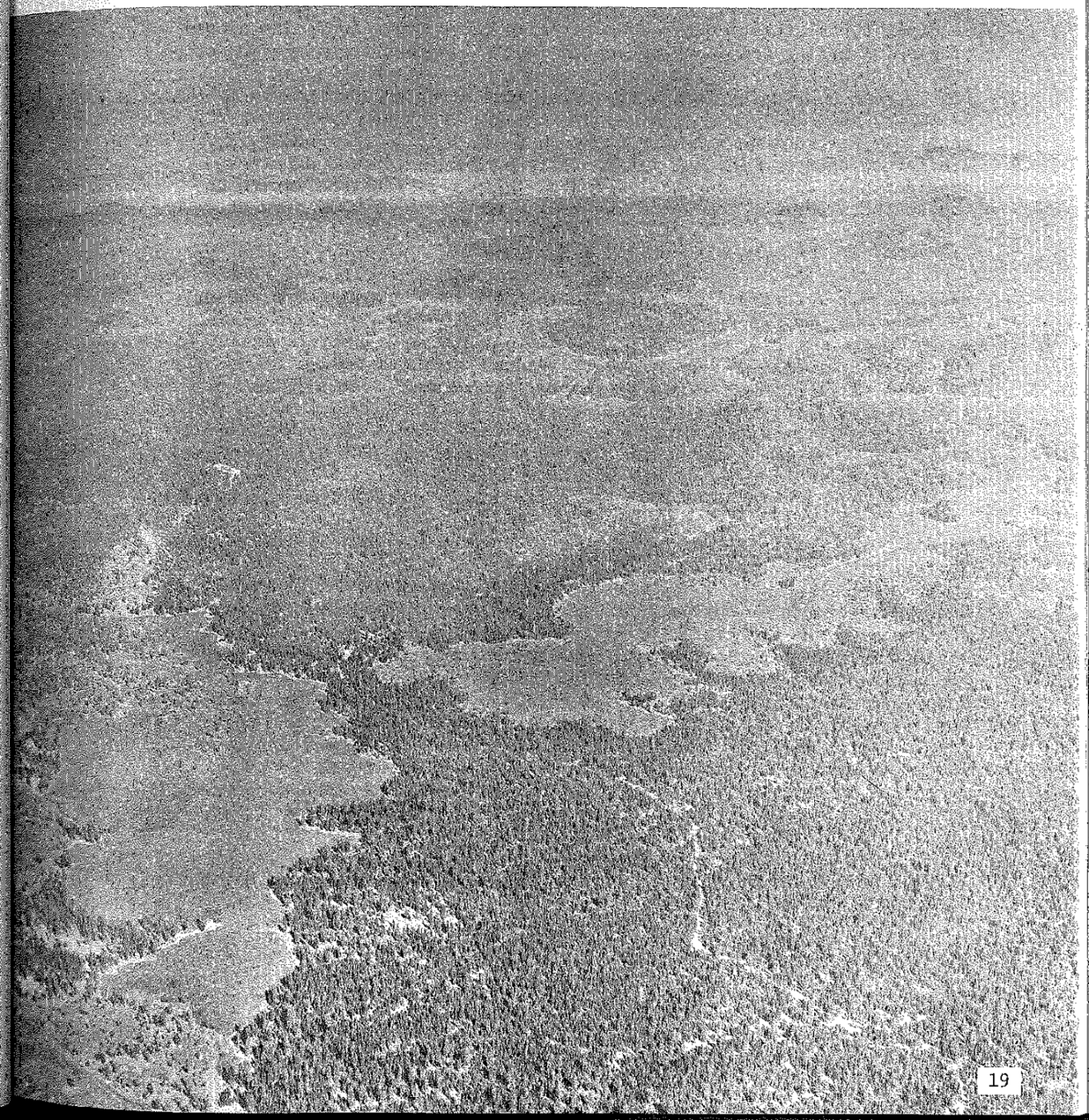
Mapping Unit 4 consists of 70 percent or more of Landtype 4 and may have inclusions of Landtypes 5, 7, 12, 15 and 16.

Landtype 4 consists of high-elevation alpine openings associated with scattered mountain hemlock and true firs. Sedges, green fescue and other grasses, and a variety of alpine forbs may occur in the openings. These sites have a harsh climate, and the trees that are present are stunted. Soils are often coarse-textured and variable in depth. Materials are a complex of volcanic and glacial components. Slopes are smooth and have less than a 30 percent gradient.

MAPPING UNIT 5 - Wet Meadows

Mapping Unit 5 consists of 70 percent or more of Landtype 5 and may have inclusions of Landtypes 2, 7, 8 and 43.

Figure 5. Recent lava flows such as those shown below are a fairly common feature of the High Lava Plains Physiographic Province on the Deschutes National Forest. These flows are located on the northwest slopes of the Paulina Mountains on the Fort Rock District. Their age can easily be identified as less than about 6,000 years, since they are not covered with Mazama pumice which blankets the surrounding area and has an estimated age of approximately 6,000 years.



MAPPING UNIT 1 - Barren Lava Flows

Mapping Unit 1 consists of 70 percent or more of Landtype 1 and may have inclusions of Landtypes 11, 74, 75, 76 and 77.

Landtype 1 consists of fresh lava flows barren of vegetation. Slopes are uneven and rugged. A volcanic ash or pumice soil is lacking on this landtype. Rock materials may include basalt, andesite, rhyolite, obsidian, or block pumice.

MAPPING UNIT 2 - High Elevation Drainages

Mapping Unit 2 consists of 70 percent or more of Landtype 2 and may have inclusions of Landtypes 5, 8 and 17.

Landtype 2 includes narrow draws, glacial valley floors, wet depressions, and drainages in the Upper Forest Zone. These are wet areas that generally support forest vegetation. Tree species consist of lodgepole pine, mountain hemlock, Engelmann spruce, and true firs. Slopes may range from nearly level up to about 50 percent. This landtype also includes seepy spots that occur under a forest canopy, and some very brushy sites with willow and alder at high elevations.

MAPPING UNIT 3 - Rocky Mountain Peaks

Mapping Unit 3 consists of 70 percent or more of Landtype 3 and may have inclusions of Landtypes 1, 13, 18 and 6.

Landtype 3 consists of high-elevation, rocky, mountain slopes and perennial snow and ice zones above timberline. Materials include basalts, andesites, rhyolites, breccias, tuffs, cinders, other pyroclastics, and fresh glacial deposits. Vegetation is lacking to extremely sparse. Slopes range from about 30 percent to nearly vertical walls.

MAPPING UNIT 4 - Alpine Meadows

Mapping Unit 4 consists of 70 percent or more of Landtype 4 and may have inclusions of Landtypes 5, 7, 12, 15 and 16.

Landtype 4 consists of high-elevation alpine openings associated with scattered mountain hemlock and true firs. Sedges, green fescue and other grasses, and a variety of alpine forbs may occur in the openings. These sites have a harsh climate, and the trees that are present are stunted. Soils are often coarse-textured and variable in depth. Materials are a complex of volcanic and glacial components. Slopes are smooth and have less than a 30 percent gradient.

MAPPING UNIT 5 - Wet Meadows

Mapping Unit 5 consists of 70 percent or more of Landtype 5 and may have inclusions of Landtypes 2, 7, 8 and 43.

Figure 5. Recent lava flows such as those shown below are a fairly common feature of the High Lava Plains Physiographic Province on the Deschutes National Forest. These flows are located on the northwest slopes of the Paulina Mountains on the Fort Rock District. Their age can easily be identified as less than about 6,000 years, since they are not covered with Mazama pumice which blankets the surrounding area and has an estimated age of approximately 6,000 years.



Landtype 5 consists of wet, nonforested areas, including meadows, depressions, and swampy areas. Soils are generally wet all or most of the year and may range from sandy gravels to peat. Vegetation consists of sedges, grasses, wetland forbs, mosses, willow and alder.

MAPPING UNIT 6 - High Elevation Canyon Walls

Mapping Unit 6 consists of 70 percent or more of Landtype 6 and may have inclusions of Landtypes 3, 13, 18 and 1A.

Landtype 6 has steep, rocky slopes at high elevations along side slopes of glacial valley walls and cirque headwalls. Timber is sparse and of low quality. Slopes are 30 to 80 percent, and avalanche chutes are fairly common. The soils are typically very stony and subject to movement, especially when platy andesites are present. Underlying materials may include volcanic rocks or glacial till. This unit is similar to Landtype 18, but is generally on a more exposed aspect and does not have as much vegetative cover. When this landtype occurs on the southern part of the Forest, a pumice soil is generally present.

MAPPING UNIT 7 - Barren Flats

Mapping Unit 7 consists of 70 percent or more of Landtype 7 and may have inclusions of Landtype 15.

Landtype 7 consists of barren pumice and cinder flats. These sites do not support timber stands and are typically located in frost pockets. Soil materials may include coarse pumice, cinders, volcanic ash, and aeolian rock fragments. Low quality lodgepole pine is generally encroaching upon these sites.

MAPPING UNIT 8 - Bottomlands

Mapping Unit 8 consists of 70 percent or more of Landtype 8 and may have inclusions of Landtypes 2, 5, 30 and 43.

Landtype 8 occurs on bottomlands, terraces, and gentle sideslopes along drainages in the Principal Forest Zone. Soils are often gravelly and subject to periodic flooding and washing. Slopes are typically less than 15 percent. Tree species include white fir, Engelmann spruce, lodgepole pine, aspen, Douglas-fir, Pacific yew, cottonwood, and some ponderosa pine. A wide variety of shrubs, sedges, grasses, and forbs are present. This landtype is similar to Landtype 2, but occurs at lower elevations. Landtype 10 also occurs along drainages in the Principal Forest, but slopes are much steeper and drier than Landtype 8.

MAPPING UNIT 9 - Barren Cinder Cones

Mapping Unit 9 consists of 70 percent or more of Landtype 9 and may have inclusions of Landtype 83.

Landtype 9 consists of essentially nonvegetated cinder cones. Soils consist of coarse-textured cinders and scoria. These cones are generally more recent than the mazama pumice and ash fall and have essentially no soil development over the cinders. Low density vegetation may be present, with the type being related to elevation. Slopes are 25 to 70 percent.

MAPPING UNIT 10 - Narrow Draws

Mapping Unit 10 consists of 70 percent or more of Landtype 10 and may have inclusions of Landtypes 8 and 59.

Landtype 10 consists of narrow draws and drainage dissections with steep side slopes. Drainages may be ephemeral, intermittent or perennial. Slopes are 20 to 100 percent. Vegetation is typically ponderosa pine and associated species. This landtype occurs on glacial till and over soft and moderately hard pyroclastic rocks. Surface soils are medium to coarse-textured pumice, volcanic ash, residuum, and colluvium.

MAPPING UNIT 11 - Lava Flow with Low Density Timber

Mapping Unit 11 consists of 70 percent or more of Landtype 11 and may have inclusions of Landtypes 1, 74, 75, 76 and 77.

Landtype 11 occurs on rough lava flows that support scattered, noncommercial timber stands. At high elevations, the primary tree species are mountain hemlock and lodgepole pine, with ponderosa pine dominating at the lower elevation and lower precipitation sites. These sites are similar to Landtype 1 but have more soil material present and support more vegetation. The rock is typically very broken basalts and scoria. An ash and pumice fall has occurred on some sites within this landtype, but most of the material filtered down into the lavas due to the open nature of the materials.

MAPPING UNIT 12 - Steep, Complex, Rocky Slopes at High Elevations

Mapping Unit 12 consists of 70 percent or more of Landtype 12 and may have inclusions of Landtypes 2, 5, 16 and 17.

Landtype 12 consists of areas with steep, complex, rocky slopes in the Upper Forest Zone. Soils are typically very shallow to moderately deep loamy sands and are underlain primarily by hard basalts and andesites, with inclusions of tuffs, breccias, and glacial till. These sites typically show modification by glacial action. This landtype is not on lava flow lands as Unit 11, and slopes tend to be steeper and longer. Slopes gradients range from 20 to 70 percent. Primary vegetation is mountain hemlock and true firs. Timber site quality is low.

MAPPING UNIT 13 - Rocky, Single Slopes on Buttes at High Elevations

Mapping Unit 13 consists of 70 percent or more of Landtype 13 and may have inclusions of Landtypes 1, 9 and 84.

Landtype 13 occurs on steep, rocky, single slopes at high elevations on shield and composite volcanoes. Stringer ridges of white bark pine and mountain hemlock characterize this landtype. Slopes are 30 to 80 percent. Soils are very shallow, very stony, and coarse-textured. This landtype is typically just downslope from Landtype 3 and just upslope from Landtype 84. It is steeper and stonier than Landtype 4.

MAPPING UNIT 14 - Edges of Lava Flows

Mapping Unit 14 consists of 70 percent or more of Landtype 14 and may have inclusions of Landtypes 1 and 68.

Landtype 14 occurs on steep, uneven slopes at the edge of lava flows. Slopes range from 25 to 80 percent. A coarse-textured volcanic ash and pumice soil is present and often overlies a finer residual soil. The soils are generally very stony and rock outcrops are common. Vegetation ranges from plant communities with juniper to mixed conifer types. Ponderosa pine and manzanita are the most prevalent species. Site quality is quite variable on this landtype, depending upon the particular climatic situation and microsite. Bedrock is typically highly fractured, hard basalts. This landtype is similar to Landtype 68, but slopes are generally shorter and more uneven and soil depths are more variable.

MAPPING UNIT 15 - Lodgepole Basins

Mapping Unit 15 consists of 70 percent or more of Landtype 15 and may have inclusions of Landtypes 7, 45, 63 and 70.

Landtype 15 occurs in depressions or nearly level land that supports lodgepole pine. This landtype includes "lodgepole-needlegrass basins." Surface soils are generally pumiceous loamy sands and sands, and underlying materials may be lavas or gravel. Frost hazard is high due to limited air drainage and other climatic and physical soil properties. Landtype 15 is commonly found around the edges of pumice flats represented by Landtype 7. Regeneration potential on this landtype is very low.

MAPPING UNIT 16

Mapping Unit 16 consists of 70 percent or more of Landtype 16 and may have inclusions of Landtypes 2, 5, 12, 17, 20, 24, 28 and 85.

Landtype 16 typically occurs on uneven glaciated uplands with smooth, complex slopes of 15 to 40 percent in the upper Forest resource zone. Elevation ranges from 4,300 to 6,500 feet. Annual precipitation is about 40 to 70 inches.

Vegetation includes mountain hemlock and true firs with huckleberry, sedges and woodrush. Lodgepole pine and white pine are minor components. Site quality is very low for timber production.

This landtype has a well drained soil derived from a moderately thick layer of pumice and volcanic ash over glacial till. Surface soils are pumiceous loamy sands and sands and buried soils are cobbly or stony sandy loams. Compact glacial till is generally encountered at a depth of 30 to 45 inches. Permeability is very rapid in the surface soil and moderate in the buried soil. Surface nonwettability is often present.

Landtype 16 is similar to Landtype 28, but occurs at higher elevations and has different vegetation. Landtype 17 is closely associated with Landtype 16, but occurs on gentler slopes and supports dominantly lodgepole pine instead of mountain hemlock. Landtype 85 occurs on basalts and andesites rather than glacial till.

Range of Soil Characteristics of Landtype 16

Litter:	Needles, twigs, and decomposing organic matter; 1 to 4 inches thick. Often forms a tight mat.
Surface Layers:	Gray to dark grayish brown loamy sand to sandy loam; weak, fine crumb structure; 0 to 20 percent pumice fragments; nonsticky, nonplastic; pH 5.5 to 6.2; 2 to 4 inches thick.
Sub-surface Layers:	Brown to yellowish brown pumiceous loamy sand to sand; single grain to massive; 5 to 30 percent pumice coarse fragments and subrounded andesite gravels by volume; nonsticky, nonplastic; pH 5.8 to 6.5; 20 to 36 inches thick.
Buried Soil:	Brown to dark brown cobbly sandy loam to loam; massive; 20 to 50 percent subrounded gravels, cobbles, and stones by volume; nonsticky to slightly sticky, nonplastic; pH 6.2 to 6.6; 0 to 24 inches thick.
Sub-strata:	Grayish colored, unweathered, compact glacial till; cobbly to very cobbly loamy sand to loam.

MAPPING UNIT 17

Mapping Unit 17 consists of 70 percent or more of Landtype 17 and may have inclusions of 2, 5, 12, 16, 19 and 73.

Landtype 17 typically occurs on gently sloping glaciated uplands with slopes of 0 to 30 percent. Elevation ranges from 4,200 to 6,500 feet. Annual precipitation is about 40 to 60 inches.

Vegetation consists of lodgepole pine with scattered mountain hemlock and true firs. Ground cover includes huckleberry, sedges, needlegrass, princess pine, lupine, squaw carpet, and pinemat manzanita. Productivity is estimated at cubic foot Site Class 6 to 7 for lodgepole pine.

This landtype has a well drained soil derived from a moderately thick layer of pumice and volcanic ash over glacial till. Surface soils are loamy sands and silty sands and subsoils are cobbly sandy loams. Compact glacial till is often encountered at a depth of 30 to 50 inches. Permeability is very rapid in the surface soil and moderate in the subsoil.

Landtype 17 is similar to Landtype 19, but occurs at higher elevations and has slightly different vegetation with a lower growth potential. Landtype 73 is similar, but the soils overlie basalts and andesites rather than glacial till. The landform of Landtype 16 is generally more sloping and supports primarily mountain hemlock instead of lodgepole pine.

Range of Soil Characteristics of Landtype 17

Litter:	Needles, twigs, and decomposing organic matter; 0.5 to 1.5 inches.
Surface Layers:	Very dark brown to dark grayish brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments and gravel; nonsticky, nonplastic; pH 6.0 to 6.5; 1 to 4 inches thick.
Sub-surface Layers:	Brown to yellowish-brown loamy sand; single grain to massive; 5 to 20 percent coarse fragments by volume, mostly pumice lapilli; nonsticky, nonplastic; pH 6.0 to 6.8; 20 to 36 inches thick.
Buried Soil:	Brown to dark brown loam to cobbly sandy loam; massive; 20 to 50 percent subrounded gravel, cobbles, and stones by volume; nonsticky to slightly sticky, nonplastic; pH 6.2 to 6.6; 0 to 24 inches thick.
Sub-strata:	Grayish colored, unweathered, compact glacial till; cobbly to very cobbly loam to loamy sand.

MAPPING UNIT 18 - Steep Slopes Along Glacial Valley Walls and Cirques Supporting Mountain Hemlock

Mapping Unit 18 consists of 70 percent or more of Landtype 18 and may have inclusions of Landtypes 2, 3, 22, 24 and 84.

Landtype 18 is a miscellaneous landtype that occurs on steep, single slopes along glacial valley walls and headwalls. Slope gradients range from about 30 to 80 percent. Elevation ranges from 4200 to 6600 feet, and the annual precipitation is about 50 to 80 inches.

This is a low quality timber site that supports mountain hemlock and true firs.

Surface soils are composed of moderately thick deposits of volcanic ash and pumice, and subsoils are typically cobbly sandy loams. In this landtype, the soils near the ridgetops are commonly underlain by bedrock, and those along the lower half of the slope consist of glacial till.

MAPPING UNIT 19

Mapping Unit 19 consists of 70 percent or more of Landtype 19 and may have inclusions of Landtypes 17, 28, and 73.

Landtype 19 occurs on gently sloping glaciated uplands. Slopes are generally less than 20 percent. Elevation ranges from 4,700 to 6,000 feet, and the annual precipitation is about 30 to 40 inches.

Vegetation consists dominantly of lodgepole pine with some white fir. Lupine, sedges, and squaw currant are common ground cover plants. Productivity is estimated at cubic foot Site Class 5 to 6 and Site Index 30 to 40 for lodgepole pine. High populations of gophers are often encountered in this landtype, which results in a limitation to regeneration success.

This landtype has well drained, coarse textured soils formed from a moderately thick layer of volcanic ash and pumice over glacial till. Surface soils are loamy sands, and buried soils are stony or cobbly sandy loams. Permeability is very rapid in the surface soils and rapid to moderate in the buried soil. Buried soils are at 18 to 36 inches.

Landtype 19 is similar to Landtype 17 but occurs at lower elevations and has a higher timber site quality. Landtype 73 occurs on andesites and basalts while Landtype 19 is on glacial till.

Range of Soil Characteristics of Landtype 19

Litter:	Needles, twigs, and decomposing organic matter; 0.5 to 1.5 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments and gravel; nonsticky, nonplastic; pH 6.0 to 6.5; 1 to 4 inches thick.
Sub-surface Layers:	Brown to yellowish brown pumiccous loamy sand; massive to single grain; 5 to 10 percent pumice coarse fragments and subrounded gravel by volume; nonsticky, nonplastic; pH 6.0 to 6.8; 18 to 36 inches thick.
Buried Soil:	Dark brown to brown sandy loam to loam; massive; 20 to 40 percent subrounded gravel, cobbles, and stones; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.0 to 6.8; 12 to 30 inches in thickness.
Sub-strata:	Grayish colored, unweathered, compact glacial till; cobbly to very cobbly loam to loamy sand.

MAPPING UNIT 20 - UNEVEN GLACIATED LANDS WITH MANY SMALL LAKES

Mapping Unit 20 is composed dominantly of Landtype 20. Landtype 20 is a miscellaneous landtype characterized by uneven glaciated lands having many small lakes and ponds. Included in the area are deposits of glacial till as well as scoured bedrock. Rock outcrops are common. Thin to moderately thick volcanic ash and pumice soils cover most of the land surface and support mostly lodgepole pine, mountain hemlock, true firs, and Engelmann spruce. Elevation ranges from 5,300 to 6,000 feet. Timber site quality is low to very low.

Other landtypes that are included in Mapping Unit 20 are Landtypes 2, 12, 16, and 17.

MAPPING UNIT 21

Mapping Unit 21 consists of 70 percent or more of Landtype 21 and may have inclusions of 22, 28, 29, 32, and 68.

Landtype 21 typically occurs on south slopes of glacial moraines. Slope gradients are 25 to 60 percent. Elevation ranges from 3,000 to 4,700 feet. The annual precipitation is about 25 to 35 inches.

Tree species consist of ponderosa pine and minor amounts of white fir and Douglas-fir. Greenleaf manzanita, snowbrush, bitterbrush, and sedges are other typical plants. Productivity is estimated at cubic foot Site Class 5, and Site Index 70 to 85 for ponderosa pine.

This landtype has well to excessively drained soils formed from a moderately thick volcanic ash layer over glacial till. Surface soils are loamy sands and subsoils are stony or cobbly sandy loams. Compact glacial till is often encountered at depths of three to five feet. Permeability is very rapid in the surface soil and moderate to slow in the subsoil.

Landtype 22 is similar to Landtype 21, but occurs on north aspects and has different vegetation. Landtype 32 is also similar to Landtype 21 with the exception of slope steepness and shape. Landtype 68 is similar to Landtype 21 but occurs over hard bedrock instead of glacial till.

Range of Soil Characteristics of Landtype 21

Litter:	Needles, leaves, twigs, and decomposing organic matter. 0.5 to 2.0 inches thick.
Surface Layers:	Dark grayish brown to yellowish brown loamy sands; massive to single grain (some weak, fine, crumb structure); 5 to 15 percent coarse fragments by volume; nonsticky, nonplastic; pH 6.0 to 6.8; 20 to 36 inches thick.
Buried Soil:	Dark brown to brown, cobbly sandy loam to loam, massive; 20 to 40 percent subrounded gravel, cobbles, and stones; nonsticky, nonplastic; pH 6.2 to 6.6; 15 to 30 inches thick.
Sub-strata:	Grayish colored, unweathered, compact glacial till; cobbly to very cobbly loam to loamy sand.

MAPPING UNIT 22

Mapping Unit 22 consists of 70 percent or more of Landtype 22 and may have inclusions of 18, 21, 24, 28, and 69.

Landtype 22 occurs on steep, north-facing slopes of glacial moraines or glacial valley walls. Slope gradients are 25 to 60 percent. Elevation ranges from 3,300 to 5,700 feet, and the annual precipitation is about 25 to 40 inches.

Major vegetation consists of mixed conifers including white fir, Douglas-fir, ponderosa pine, larch, and white pine. Shrubs and ground plants include vine maple, snowbrush, chinquapin, currant, snowberry, princess pine, sedges, and a variety of forbs. Productivity is estimated at cubic foot Site Class 4 and 5, and Site Index 75 to 95 for ponderosa. Site Index is 45 to 55 for white fir, with a cubic foot Site Class of 4.

This landtype has well drained soils derived from a moderately thick layer of volcanic ash over glacial till. Surface soils are typically loamy sands and subsoils are sandy loams. Moderate to strongly compact glacial till is encountered at a depth of 30 to 60 inches. Permeability is very rapid in the surface soil and moderate to slow in the subsoil.

Landtype 22 is similar to Landtype 21 with the exception of slope aspect and vegetation. Landtype 69 is similar to Landtype 22 but occurs on hard bedrock instead of glacial till. Landtype 24 has more drainages and seepy spots than Landtype 22, and slopes are generally more uneven.

Range of Soil Characteristics of Landtype 22

Litter:	Needles, leaves, twigs, and decomposing organic matter. 1 to 3 inches thick.
Surface Layers:	Dark grayish brown to strong brown loamy sand to sandy loam; massive to single grain (some weak fine crumb structure); 2 to 15 percent coarse fragment content by volume; nonsticky, nonplastic; pH 6.0 - 6.8; 20 to 40 inches thick.
Buried Soil:	Dark brown to brown cobbly sandy loam to loam; massive; 20 to 40 percent subrounded gravel, cobbles, and stones by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.2 to 6.8; 15 to 30 inches in thickness.
Sub-strata:	Grayish colored, unweathered, compact glacial till; cobbly to very cobbly loam to loamy sand.

MAPPING UNIT 23

Mapping Unit 23 consists of 70 percent or more of Landtype 23 and may have inclusions of Landtypes 22, 24, 28, 69, and 95.

Landtype 23 occurs on steep, north slopes of glacial moraines and glacial valley walls. Slope gradients are 25 to 60 percent. Elevation ranges from 4,000 to 4,500 feet, and the annual precipitation is about 40 to 60 inches.

Vegetation consists of mixed conifers including white fir, Douglas-fir, and ponderosa pine over vine maple, snowbrush, Oregon grape, and forbs. Productivity is estimated at cubic foot Site Class 4, and Site Index 45 to 55 for white fir; and Site Class 4 to 5, and Site Index 90 to 110 for Douglas-fir.

This landtype has well drained, sandy soils derived from black volcanic ash over glacial till. Surface soils are loamy sands and sands and subsoils are stony, sandy loams. Permeability is very rapid in the surface soil and moderate in the subsoil. A very compact layer of glacial till with slow permeability occurs intermittently in this landtype at depth from three to six feet.

Landtype 23 is similar to Landtype 22, but has a thicker and sandier surface soil.

Range of Soil Characteristics of Landtype 23

Litter:	Needles, leaves, twigs, and decomposing organic matter. 1 to 3 inches thick.
Surface Layers:	Dark grayish brown to black loamy sand and sand; single grain; less than 5 percent coarse fragments by volume; nonsticky, nonplastic; pH 6.0 - 6.8; 24 to 50 inches thick.
Buried Soil:	Dark brown to yellowish brown loamy sand to loam; massive; 10 to 40 percent subrounded gravel, cobbles, and stones by volume; nonsticky, nonplastic; pH 6.2 to 6.6; 20 to 40 inches thick.
Substrata:	Grayish colored, unweathered, compact glacial till; cobbly to very cobbly or stony loam to loamy sand.

MAPPING UNIT 24

Mapping Unit 24 consists of 70 percent or more of Landtype 24 and may have inclusions of 18, 22, 28, and 69.

Landtype 24 occurs on steeply sloping, moderately dissected and somewhat hummocky side slopes along glacial valley walls and moraines. Slopes are 20 to 60 percent. Drainages and seepy spots are common. Aspects are generally northerly. Elevation ranges from 3,600 to 4,300 feet, and the annual precipitation is about 40 to 55 inches.

Vegetation consists of mixed conifers including white fir, Douglas-fir, ponderosa pine, lodgepole pine, and some white pine. Shrubs and ground cover plants included snowbrush, vine maple, willow, sedges, and a variety of forbs. Productivity is estimated at cubic foot Site Class 4 and Site Index 45 to 55 for white fir; and 80 to 100 for Douglas-fir, with a cubic foot Site Class of 5.

This landtype has well drained soils with many seepy spots and small drainages included. Soils are derived from a thin to moderately thick layer of volcanic ash over glacial till. Surface soils are loamy sands and subsoils are typically cobbly sandy loams. Permeability is rapid to very rapid in the surface soil and moderate to slow in the subsoil.

Landtype 24 is similar to Landtype 22, but is a more unstable unit with more seeps and drainages present.

Range of Soil Characteristics of Landtype 24

Litter:	Needles, leaves, twigs, and decomposing organic matter. 1 to 3 inches thick.
Surface Layers:	Dark grayish brown to strong brown loamy sand to sandy loam; massive to single grain (some weak fine crumb structure); 2 to 10 percent coarse fragment content by volume; nonsticky, nonplastic; pH 6.0 - 6.8; 15 to 30 inches thick.
Buried Soil:	Dark brown to brown cobbly loam to loamy sand; massive; 20 to 50 percent subrounded gravel, cobbles, and stones by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.2 to 6.8; 0 to 40 inches thick.
Substrata:	Grayish colored, unweathered, compact glacial till, cobbly to very cobbly or stony loam to loamy sand.

MAPPING UNIT 25

Mapping Unit 25 consists of 70 percent or more of Landtype 25 and may have inclusions of 19, 21, 22, and 65.

Landtype 25 occurs on uneven glaciated lands. Slopes are complex and the gradients range from about 10 to 40 percent. Elevation ranges from 4,400 to 5,400 feet, and the annual precipitation is about 25 to 40 inches.

Primary vegetation consists of mixed conifers including ponderosa pine, white fir, lodgepole pine, and some white pine and other firs. Shrubs and ground cover plants include snowbrush, manzanita, sedges, and forbs. Productivity is estimated at cubic foot Site Class 4 to 5, and Site Index 75 to 90 for ponderosa pine.

This landtype has a well to excessively drained soil derived from a moderately thick layer of pumice and volcanic ash over glacial till. Surface soils are pumiceous loamy sands and sands, and buried soils are cobbly or stony sandy loams. Permeability is very rapid in the surface soil and moderate in the buried soil.

Landtype 25 is similar to Landtype 28 only the surface soils are coarser textured and the vegetation is slightly different.

Range of Soil Characteristics of Landtype 25

Litter:	Needles, leaves, twigs, and decomposing organic matter. 1 to 2 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments and gravel; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 6 inches thick.
Sub-surface Layers:	Brown to yellowish brown loamy sand to sand; massive to single grain; 8 to 30 percent pumice coarse fragments and subrounded gravel by volume; nonsticky, nonplastic; pH 6.0 to 6.8; 20 to 36 inches thick.
Buried Soil:	Dark brown to brown cobbly sandy loam to loam; massive; 20 to 50 percent subrounded gravel, cobbles, and stones by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.0 to 6.8; 12 to 36 inches thick.
Sub-strata:	Grayish colored, unweathered, compact glacial till; cobbly to very cobbly loam to loamy sand.

MAPPING UNIT 26

Mapping Unit 26 consists of 70 percent or more of Landtype 26 and may have inclusions of 8, 21, 22, 25, 68, and 90.

Landtype 26 occurs on smooth, gentle to moderately sloping toeslopes and alluvial fans. Slopes are 10 to 30 percent. Elevation ranges from 3,000 to 4,000 feet, and the annual precipitation is about 25 to 35 inches.

Vegetation includes ponderosa pine, Douglas-fir, and white fir over snowbrush, manzanita, and sedges. Productivity is estimated at cubic foot Site Class 4 to 5, and Site Index 75 to 95 for ponderosa pine.

This landtype typically has well drained, coarse textured soils derived from a moderately thick layer of pumice and volcanic ash over glacial till or colluvium. Surface soils are loamy sand and subsoils are loam to sandy loam. Permeability is rapid to very rapid in the surface soil and rapid to moderate in the subsoil.

Landtype 26 is similar to Landtype 90 but the soils are coarser textured and vegetation is slightly different. Landtypes 21 and 22 occur on steeper slopes than Landtype 26, and Landtype 25 differs in slope shape and position.

Range of Soil Characteristics of Landtype 26

Litter:	Needles, leaves, twigs, and decomposing organic matter. 1 to 2 inches thick.
Surface Layers:	Dark grayish brown to yellowish brown loamy sand to sand; massive to single grain; 5 to 20 percent pumice lapilli and subrounded gravel by volume; nonsticky, nonplastic; pH 6.0 - 6.8; 24 to 36 inches thick.
Buried Soil:	Dark brown to dark grayish brown cobbly to bouldery sandy loam; massive; 30 to 70 percent subrounded to blocky gravel, cobbles, stones, and boulders; nonsticky, nonplastic; pH 6.4 to 6.8; 30 to 60 inches thick.
Sub-strata:	Grayish colored, unweathered, compact glacial till; cobbly to very cobbly loam to loamy sand.

MAPPING UNIT 27

Mapping Unit 27 consists of 70 percent or more of Landtype 27 and may have inclusions of 21, 22, 28, and 79.

Landtype 27 occurs on long, smooth to moderately dissected slopes on glacial moraines. Slope gradients are 20 to 50 percent. Elevation ranges from 4,200 to 4,800 feet, and the annual precipitation is about 35 to 45 inches.

Vegetation consists dominantly of white fir, Douglas-fir, and ponderosa pine over snowbrush, sedges, and forbs. Some pinegrass may be included. Productivity is estimated at cubic foot Site Class 4 to 5, and Site Index 80 to 100 for ponderosa pine. Site Index is 45 to 55 for white fir, at cubic foot Site Class 4.

This landtype has well drained soils derived from a moderately thick layer of volcanic ash over glacial till. Surface soils are sandy loam to loamy sand, and subsoils are cobbly to stony sandy loam to loam. Premeability of the surface soil is rapid to very rapid and moderate in the subsoil.

Landtype 27 is similar to Landtype 22, but the slopes are generally longer and not quite as steep. Landtype 28 is similar to Landtype 27, but differs in slope shape. Landtype 79 is somewhat similar to Landtype 27 but is generally steeper and the soil is underlain by andesitic or basaltic bedrock instead of glacial till.

Range of Soil Characteristics of Landtype 27

Litter:	Needles, leaves, twigs, and decomposing organic matter. 1 to 3 inches thick.
Surface Layers:	Brown to dark grayish brown sandy loam to loamy sand; massive to weak, fine, crumb structure; 5 to 20 percent subrounded coarse fragments by volume; nonsticky, nonplastic; pH 6.0 to 6.6; 15 to 30 inches thick.
Buried Soil:	Brown to dark brown sandy loam to loam; massive; 20 to 40 percent subrounded coarse fragments by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.0 to 6.5; 15 to 30 inches thick.
Sub-strata:	Grayish colored, unweathered, compact glacial till; cobbly to very cobbly or stony loam to loamy sand.

MAPPING UNIT 28

Mapping Unit 28 consists of 70 percent or more of Landtype 28 and may have inclusions of Landtypes 8, 19, 21, 22, 25, 29 and 65.

Landtype 28 occurs on uneven glaciated uplands. Slopes are complex with a gradient of 10 to 40 percent. Elevation ranges from 4,300 to 5,500 feet, and the annual precipitation is about 35 to 45 inches.

Vegetation consists of mixed conifers including white fir, Douglas-fir, ponderosa pine, lodgepole pine and some white pine and other true firs at the upper elevation limits of this landtype. Shrubs and ground cover include snowbrush, currant, snowberry, Oregon grape, princess pine, lathyrus, sedges, pinegrass, and a variety of forbs. Some vine maple and chinquapin are also included in some places. Productivity is estimated at cubic foot Site Class 4 to 5, and Site Index 80 to 100 for ponderosa pine. Site Index is 45 to 60 for white fir, at a cubic foot Site Class of 3 to 4.

This landtype has well drained soils derived from a moderately thick layer of volcanic ash over glacial till. Surface soils are typically loamy sands, and subsoils are cobbly to bouldery sandy loams. A compact zone of glacial till is often encountered at a depth of 40 to 60 inches. Permeability is rapid to very rapid in the surface soil and moderate to slow in the subsoil.

Landtype 28 is similar to Landtype 25, but differs in soil texture and ground cover composition and density. Landtype 28 is similar to Landtype 22, but slopes are not quite as steep and slope shape is different. Landtype 29 has more gentle slopes than Landtype 28 and generally occurs at lower elevations adjacent to this landtype.

Range of Soil Characteristics of Landtype 28

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 3 inches thick.
Surface Layers:	Dark grayish brown to brown sandy loam to loamy sand; weak, fine, crumb structure to massive; 5 to 10 percent subrounded coarse fragments by volume; nonsticky, nonplastic; pH 6.0 to 6.8; 18 to 30 inches thick.
Buried Soil:	Brown to dark brown cobbly sandy loam to loam; massive; 20 to 40 percent gravel cobbles, stones, and boulders by volume; slightly sticky to nonsticky, slightly plastic to nonplastic; pH 6.2 to 6.6; 10 to 40 inches thick.
Sub-strata:	Grayish colored, unweathered, compact glacial till; cobbly to very cobbly or stony loam to loamy sand.

MAPPING UNIT 29

Mapping Unit 29 consists of 70 percent or more of Landtype 29 and may have inclusions of Landtypes 22, 28, 30, 32 and 65.

Landtype 29 occurs on gently sloping glaciated uplands. Slope gradients are 5 to 20 percent. Elevation ranges from 3,600 to 5,000 feet, and the annual precipitation is about 30 to 40 inches.

Vegetation consists dominantly of ponderosa pine, Douglas-fir, and white fir over snowbrush, pinegrass, bracken fern, sedges, and forbs. Productivity is estimated at cubic foot Site Class 4 and 5, and Site Index 80 to 100 for ponderosa pine. Site Index is 45 to 60 for white fir, at a cubic foot Site Class of 3 to 4.

This landtype has well drained soils derived from a moderately thick layer of volcanic ash over glacial till. Surface soils are typically loamy sands and subsoils are cobbly or stony sandy loams. Permeability is very rapid in the surface soil and moderate in the subsoil.

Landtype 29 often occurs on the landscape between Landtypes 28 and 32. It is similar to 28, but the slopes are smoother and more gentle. Landtype 32 is a drier unit than Landtype 29 and has more manzanita and bitterbrush present.

Range of Soil Characteristics of Landtype 29

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 2 inches thick.
Surface Layers:	Dark grayish brown to brown sandy loam to loamy sand; weak, fine, crumb structure to massive; 2 to 10 percent subrounded coarse fragments by volume; nonsticky, nonplastic; pH 6.0 to 6.8; 20 to 40 inches thick.
Buried Soil:	Dark brown to brown cobbly sandy loam to loam; massive; 20 to 50 percent subrounded gravel, cobbles, and stones by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.2 to 6.6; 10 to 30 inches thick.
Sub-strata:	Grayish colored, unweathered, compact to noncompact glacial till; cobbly to very cobbly loam to loamy sand.

MAPPING UNIT 30

Mapping Unit 30 consists of 70 percent or more of Landtype 30 and may have inclusions of Landtypes 5, 8, 28, 29 and 40.

Landtype 30 occurs on gently sloping glaciated lands subject to high water tables during runoff periods. This landtype typically lies between moderately sloping glacial uplands and outwash plains. Slope gradients are 0 to 15 percent. Elevation ranges from 3,000 to 4,000 feet, and the annual precipitation is about 30 to 40 inches.

White fir is a major component of the timber stand, along with Douglas-fir, larch, and ponderosa pine. Vine maple, alder, Oregon grape, and princess pine are common species. A variety of shrubs, forbs, and grasses occur on these sites if timber is removed. Productivity is estimated at cubic foot Site Class 3 to 4 and Site Index 45 to 60 for white fir.

This landtype has moderately well to somewhat poorly drained soils formed from volcanic ash and glacial-fluvial deposits. Surface soils are typically sandy loams or loamy sands, and subsoils are cobbly or stony sandy loams. Permeability is rapid in the surface soil and moderate to slow in the subsoil.

Landtype 30 is similar to Landtype 8, but does not have as much variability in soils and vegetation. Landtype 30 is somewhat similar to Landtype 40, but the soils are coarser textured.

Range of Soil Characteristics of Landtype 30

Litter:	Needles, leaves, twigs, and decomposing organic matter; 2 to 3 inches thick.
Surface Layers:	Dark grayish brown to dark yellowish-brown sandy loam to loamy sand; weak, medium, granular structure to massive; 5 to 30 percent rounded and subrounded gravel and cobbles by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.0 to 6.5; 10 to 30 inches thick.
Buried Soil:	Dark yellowish-brown to brown cobbly sandy loam to loam; massive; 20 to 50 percent rounded and subrounded gravel, cobbles and stones by volume; slightly sticky to nonsticky, slightly plastic to nonplastic; pH 6.2 to 6.5; 0 to 20 inches thick.
Sub-strata:	Grayish colored, unweathered, compact glacial deposits; cobbly to very cobbly loamy sand to loam.

MAPPING UNIT 31

Mapping Unit 31 consists of 70 percent or more of Landtype 31 and may have inclusions of 2, 16, 18, 22, 25 and 8A.

Landtype 31 occurs on steeply sloping glacial valley walls and side slopes of moraines. Slope gradients are 25 to 70 percent. Elevation ranges from 4,700 to 5,500 feet, and the annual precipitation is about 40 to 60 inches.

Tree species consist of mixed conifers including Douglas-fir, Shasta red fir, white pine, mountain hemlock, white fir, lodgepole pine, and some high elevation ponderosa pine. Shrubs and ground cover plants are quite varied and include huckleberry, service berry, chinquapin, sedges, mosses, and forbs. Much of this landtype has low productivity due to steep slopes and high elevations.

This landtype has well drained, coarse-textured soils derived from pumice and volcanic ash over glacial till. Surface soils are pumiceous loamy sands, and sands and buried soils are cobbly or stony sandy loams. Permeability is very rapid in the surface soil and moderate in the buried soil.

Landtype 31 is similar to Landtype 18, but the soils are coarser textured and Landtype 31 tends to have less mountain hemlock. It is similar to Landtype 22, but occurs at higher elevations and soils are coarser textured. Landtype 8A is similar to Landtype 31, but occurs on basaltic and andesitic bedrock instead of glacial till.

Range of Soil Characteristics of Landtype 31

Litter:	Needles, leaves, twigs and decomposing organic matter; 1 to 4 inches thick. Often forms a tight mat.
Surface Layers:	Gray to dark grayish brown loamy sand; weak, fine crumb structure; 5 to 20 percent pumice fragments; nonsticky, nonplastic; pH 5.5 to 6.0; 2 to 6 inches thick.
Subsurface Layers:	Brownish-red to brownish-yellow pumiceous loamy sand to sand; single grain; 5 to 40 percent pumice coarse fragments with some subrounded gravel; nonsticky, nonplastic; pH 5.8 to 6.5; 24 to 45 inches thick.
Buried Soil:	Dark brown to brown sandy loam to loamy sand; massive; 20 to 40 percent subrounded gravel, cobbles, stones, and boulders by volume; nonsticky, nonplastic; pH 6.0 to 6.6; 0 to 30 inches over.
Substrata:	Grayish colored, unweathered, compact glacial till, cobbly to very cobbly loamy sand to loam. Very thin to lacking near ridgetops.

MAPPING UNIT 32

Mapping Unit 32 consists of 70 percent or more of Landtype 32 and may have inclusions of Landtypes 1, 21, 25, 29, 37 and 64.

Landtype 32 occurs on gently sloping to uneven glaciated uplands. Slope gradients are less than 30 percent. Elevation ranges from 3,200 to 4,600 feet, and the annual precipitation is about 18 to 30 inches.

Vegetation consists of ponderosa pine over bitterbrush, manzanita, Idaho fescue and sedges. At the upper elevational range of Landtype 32, snowbrush is included and rabbitbrush is present at the lower elevational range. Productivity is estimated at cubic foot Site Class 5 and Site Index 65 to 85 for ponderosa pine.

This landtype has well to excessively drained soils derived from pumiceous volcanic ash over glacial till. Surface soils are typically loamy sands, and subsoils are cobbly or stony sandy loams. Permeability is very rapid in the surface soil and moderate in the subsoil.

Landtype 32 is similar to Landtype 37, only slopes tend to be more uneven and steeper, and the material under the volcanic ash is glacial till instead of outwash. Landtype 32 typically occurs just upslope from Landtype 37. Landtype 64 is similar to Landtype 32, but is on lava bedrock instead of glacial till.

Range of Soil Characteristics of Landtype 32

Litter:	Needles, leaves, twigs and decomposing organic matter; 0.5 to 2 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments and gravel; nonsticky, nonplastic pH 6.0 to 6.8; 2 to 6 inches thick.
Subsurface Layers:	Brown to yellowish-brown pumiceous loamy sand to sand; massive to single grain; 5 to 20 percent pumice and subrounded gravel by volume; nonsticky, nonplastic; pH 6.0 to 7.0; 18 to 36 inches thick.
Buried Soil:	Dark brown to dark cobbly sandy loam to loam; massive; 20 to 50 percent subrounded gravel, cobbles, and stones by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.2 to 6.8; 10 to 20 inches.
Substrata:	Grayish colored, unweathered glacial till; may be compact; cobbly to very cobbly loamy sand to loam.

MAPPING UNIT 33

Mapping Unit 33 consists of 70 percent or more of Landtype 33 and may have inclusions of Landtypes 28 and 34.

Landtype 33 occurs on gently sloping to uneven glaciated lands. Slope gradients are 0 to 25 percent. Elevation ranges from 3,500 to 4,300 feet, and the annual precipitation is about 35 to 45 inches.

Tree species consist of mixed conifers including Douglas-fir, white fir, ponderosa pine, and white pine. Shrubs and ground cover plants consist of chinquapin, snowbrush, currant, snowberry, traveling blackberry, Oregon grape, sedges, and a variety of forbs. Productivity is estimated at cubic foot Site Class 4 to 5, and Site Index 75 to 95 for ponderosa pine, and 90 to 120 for Douglas-fir.

This landtype has a well to excessively drained, coarse textured soil derived from a moderately thick to thick layer of dark colored cinders over volcanic ash and glacial till. Surface soils are very cindery sands, and subsoils are loamy sands and cobbly to stony sandy loams. Permeability of the surface soil is very rapid. In the volcanic ash and upper part of the glacial soil, the permeability is rapid to moderate. At greater depths in the glacial till, the permeability is slow to moderate.

Landtype 33 is similar to Landtype 28, only the surface soil is much coarser textured. It is similar to Landtype 34, but slopes are not as steep.

Range of Soil Characteristics of Landtype 33

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 3 inches thick.
Surface Layers:	Black to brown very cindery sand; single grain; 60 to 90 percent gravel sized cinders by volume; nonsticky, nonplastic; pH 6.0 to 6.8; 20 to 80 inches thick.
Buried Soil:	Ash Layer - Very dark brown to yellowish-brown loamy sand to fine sand; massive to single grain; 0 to 10 percent subrounded gravel by volume; nonsticky, nonplastic; pH 6.4 to 6.8; 20 to 45 inches thick. Glacial Till - Yellowish-brown to brown cobbly to stony sandy loam to loam; massive; 20 to 50 percent subrounded and rounded gravel, cobbles, and stones by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.2 to 6.6; 10 to 30 inches thick.
Substrata:	Grayish colored, unweathered, compact glacial till; cobbly to very cobbly loamy sand to loam.

MAPPING UNIT 34

Mapping Unit 34 consists of 70 percent or more of Landtype 34 and may have inclusions of Landtypes 22, 28 and 33.

Landtype 34 occurs on steep side slopes of glacial moraines. Slope gradients are 25 to 60 percent. Elevation ranges from 3,500 to 4,000 feet. Annual precipitation is estimated at 40 to 60 inches.

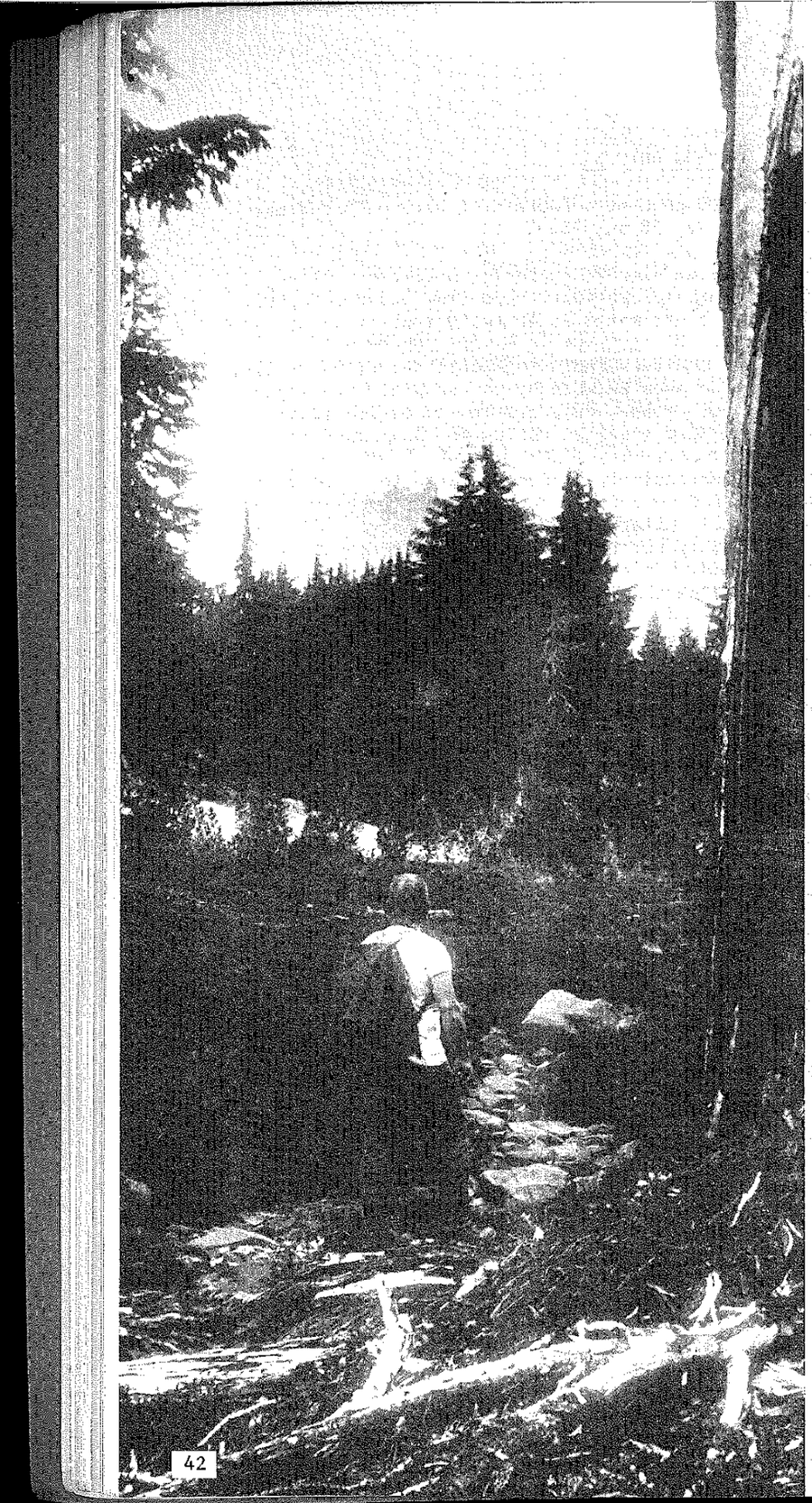
Vegetation consists of mixed conifers including Douglas-fir, white fir, white pine, and ponderosa pine over snowbrush, chinquapin, vine maple, Oregon grape, and a variety of forbs. Productivity is estimated at cubic foot Site Class 5, and Site Index 90 to 100 for Douglas-fir.

This landtype has a well to excessively drained, coarse textured soil derived from a moderately thick to thick layer of cinders over volcanic ash and glacial till. Surface soils are very cindery sands, and subsoils are loamy sands and cobbly to stony sandy loams. Permeability of the surface soil is very rapid. In the volcanic ash (subsoil) and upper part of the glacial till, the permeability is rapid to moderate.

Landtype 34 is similar to Landtype 33, but occurs on steeper slopes. It is similar to Landtype 9J except the surface soils are dark colored cinders rather than light colored dacite pumice. Landtype 22 is similar, but the soils are finer textured since the cinder layer is lacking.

Range of Soil Characteristics of Landtype 34

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 3 inches thick.
Surface Layers:	Black to brown very cindery sand; single grain; 60 to 90 percent gravel sized cinders by volume; nonsticky, nonplastic; pH 6.0 to 6.8; 20 to 60 inches thick.
Buried Soil:	Ash Layer - Black to yellowish-brown loamy sand to sand; massive to single grain; 0 to 10 percent subrounded gravel by volume; nonsticky, nonplastic; pH 6.4 to 6.8; 20 to 45 inches thick. Glacial Till - Yellowish-brown to brown cobbly to stony sandy loam to loam; massive; 20 to 50 percent subrounded and rounded gravel, cobbles, and stones by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.2 to 6.6; 10 to 30 inches thick.
Substrata:	Grayish colored, unweathered, compact glacial till; cobbly to very cobbly loamy sand to loam.



MAPPING UNIT 35

Mapping Unit 35 consists of 70 percent or more of Landtype 35 and may have inclusions of 14, 38, 41, 64 and 68.

Landtype 35 typically occurs on south aspects of steep, smooth to slightly dissected slopes on outwash sands and gravels. Slope gradients are 25 to 60 percent. Elevation ranges from 4,400 to 5,600 feet. Annual precipitation is estimated at 20 to 25 inches.

Vegetation typically consists of ponderosa pine, manzanita, bitterbrush, Idaho fescue and sedges. Idaho fescue is not present at the upper elevation range of this landtype. Productivity is estimated at cubic foot Site Class 5 to 6, and Site Index 60 to 80 for ponderosa pine.

This landtype has an excessively drained, coarse textured soil derived from a moderately thick layer of pumice and volcanic ash over outwash sands and gravels. Surface soils are pumiceous loamy sands and sands. Buried soils are sandy loam in the upper portion, with sands and gravels below. The lower buried soil is compact in some cases. Permeability is very rapid in the surface soil and very rapid to moderate in the buried soil.

Landtype 35 is similar to Landtype 41, but occurs on steeper slopes. Landtype 38 is similar, but has different vegetation and usually occurs on north aspects. Landtype 35 is similar to Landtype 68, only the soils are underlain by sands and gravels rather than hard bedrock.

Range of Soil Characteristics of Landtype 35

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 2 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments and gravel; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 6 inches thick.
Sub-surface Layers:	Brown to brownish-yellow pumiceous loamy sand to sand; single grain to massive; 5 to 20 percent pumice and subronnded gravel by volume; nonsticky, nonplastic; pH 6.5 to 7.0; 20 to 40 inches thick.
Buried Soil:	Brown to grayish brown sandy loam to gravelly sand; massive to single grain; 20 to 70 percent subrounded gravels by volume; nonsticky, nonplastic; pH 6.5 to 7.0; greater than five feet thick.

MAPPING UNIT 36

Mapping Unit 36 consists of 70 percent or more of Landtype 36 and may have inclusions of Landtypes 6A, 37, 48 and 72.

Landtype 36 occurs on gently sloping glacial ontwash plains and terraces in a low precipitation zone. Slope gradients are commonly 0 to 8 percent, but range up to 30 percent. Elevation ranges from 3,200 to 4,200. Annual precipitation is estimated at 12 to 18 inches.

The timber stand consists of ponderosa pine and juniper. Ground cover is made up of species such as bitterbrush, rabbitbrusb, sagebrush, Idaho fescue, wheatgrass, and squirreltail. This is a low quality landtype for timber production.

This landtype has excessively drained soils composed of shallow to moderately thick, sandy, volcanic ash soils over glacial outwash or other water deposted sands and gravels. Surface soils are typically loamy sands and buried soils are.gravelly loamy sands or gravelly sands. Permeability is generally very rapid in both the surface soil and the buried soil, but a compact layer is sometimes present in the buried soil which has a lower permeability rate.

Landtype 36 is similar to Landtype 37, but occurs at lower elevations where precipitation is less and vegetation is different. Landtype 36 occurs at higher elevations than Landtype 48, and supports more tree specics and less sagebrush. Landtype 72 is similar, but occurs on lavas instead of outwash.

Range of Soil Characteristics of Landtype 36

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 1 inch thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 5 to 20 percent pumice fragments and gravel; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 8 inches thick.
Sub-surface Layers:	Dark brown to pale brown sandy loam to loamy sand; massive; 5 to 30 percent subrounded gravel and cobbles by volume; nonsticky, nonplastic; pH 6.5 to 7.8; 10 to 36 inches thick.
Buried Soil:	Brown to grayish brown gravelly sandy loam to gravelly sand; single grain to massive; 30 to 80 percent gravel and cobbles by volume; nonsticky, nonplastic; pH 6.5 to 7.8; greater than five feet thick.

MAPPING UNIT 37

Mapping Unit 37 consists of 70 percent or more of Landtypc 37 and may have inclusions of Landtypes 6A, 32, 36, and 64.

Landtype 37 occurs on gently sloping glacial outwash plains and terraces. Slope gradients are 0 to 20 percent. Elevation ranges from 3,200 to 4,500 feet. Annual precipitation is estimated at 18 to 30 inches.

Vegetation consists primarily of ponderosa pinc, bitterbrush, manzanita, and Idaho fescue. At the upper elevation range, snowbrush, sedges, and a small amount of white fir may occur. At the lower elevation range a ponderosa pine, bitterbrush, Idaho fescue plant community is typically present. Productivity is estimated at cubic foot Site Class 5 and 6 and Site Index 60 to 85 for ponderosa pine.

This landtype has well to excessively drained soils derived from a thin to moderately thick layer of volcanic ash over outwash materials. Surface soils are typically loamy sands and buried soils are gravelly sandy loams to very gravelly sands. Compact zones are sometimes encountered in the buried soil. Permeability is typically very rapid in both the surface soils and the subsoils. Some restriction in permeability occurs where compact materials are encountered in the buried soil.

Landtype 37 is similar to Landtype 36, but occurs at higher elevations and has a higher site potential. It is similar to Landtype 32, but slopes are more gentle, and Landtype 32 is on glacial till instead of outwash. Landtype 64 is similar, but occurs on lavas, and slopes are generally more uneven.

Range of Soil Characteristics of Landtype 37

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 2 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 5 to 20 percent pumice fragments and gravel; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 6 inches thick.
Sub-surface Layers:	Yellowish-brown to dark brown sandy loam to loamy sand; massive; 5 to 30 percent subrounded gravel and cobbles by volume; pH 6.5 to 7.0; 12 to 36 inches thick.
Buried Soil:	Brown to grayish brown gravelly sandy loam to very gravelly sands; single grain to massive; 30 to 80 percent subrounded gravel and cobbles by volume (various colored cinder deposits are sometimes present); nonsticky; nonplastic; pH 6.5 to 7.5; greater than five feet thick.

MAPPING UNIT 38

Mapping Unit 38 consists of 70 percent or more of Landtype 38 and may have inclusions of 14, 35, 42, and 69.

Landtype 38 occurs on steep, smooth to slightly dissected side slopes on outwash plains and along drainages. Aspects are generally northerly and slope gradients range from 25 to 60 percent. Elevation ranges from 4,400 to 5,800 feet. Precipitation is estimated at 22 to 30 inches per year.

Vegetation consists of mixed conifers, including white fir, ponderosa pine, and lodgepole pine over snowbrush, manzanita and sedges. Productivity is estimated at cubic foot Site Class 5 and Site Index 70 to 85 for ponderosa pine.

This landtype has well to excessively drained soils derived from a moderately thick layer of volcanic ash and pumice over older soils on outwash gravels and sands. Surface soils are typically pumiceous loamy sand and buried soils are sandy loam to gravelly sand. Permeability is very rapid in the surface soil and very rapid to moderate in the buried soils.

Landtype 38 is similar to Landtype 35, but aspects and vegetation differs. Landtype 69 is similar, but occurs on hard bedrock. Landtype 42 is similar, but has more gentle slopes.

Range of Soil Characteristics of Landtype 38

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 3 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments and gravel; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 6 inches thick.
Sub-surface Layers:	Brown to yellowish brown pumiceous loamy sand to sand; massive to single grain; 5 to 20 percent pumice and subrounded gravel by volume; nonsticky, nonplastic; pH 6.5 to 7.0; 18 to 40 inches thick.
Buried Soil:	Brown to grayish brown sandy loam to sand; massive to single grain; 20 to 70 percent subrounded and rounded gravels by volume; nonsticky, nonplastic; pH 6.5 to 7.0; greater than five feet thick.

MAPPING UNIT 39

Mapping Unit 39 consists of 70 percent or more of Landtype 39 and may have inclusions of Landtypes 8, 30, 37, and 40.

Landtype 39 occurs on gently sloping outwash plains and lake basins. Slopes are typically less than 10 percent. Elevation ranges from 3,000 to 3,300 feet. Precipitation is estimated at 25 to 35 inches per year.

Ponderosa pine, bitterbrush, and Idaho fescue are typical plant species. Arrowleaf balsamroot is present on the more zeric site of this landtype, and larch, lodgepole pine, Douglas-fir, and white fir may occur on the moister sites. Productivity is estimated at cubic foot Site Class 5 to 6 and Site Index 60 to 80 for ponderosa pine.

This landtype has well drained soils derived from volcanic ash, glacial outwash, and lacustrine deposits. Surface soils are typically sandy loam or loamy sand and subsoils consist of stratified loam, silt loam, gravelly sandy loam, and clay loam. Permeability of the surface soil is rapid to very rapid. In the subsoil, the permeability ranges from slow to rapid. A perched watertable is common over the finer sediments during spring runoff.

Landtype 39 is similar to Landtype 37, but subsoil materials are finer textured. It is similar to Landtype 40, but occurs on sites that have better drainage.

Range of Soil Characteristics of Landtype 39

Litter:	Needles, leaves, twigs and decomposing organic matter; 0.5 to 2 inches thick.
Surface Layers:	Dark brown to brown sandy loam to loamy sand; weak, fine, crumb structure to massive; 2 to 15 percent subrounded and rounded gravels by volume; nonsticky, nonplastic; pH 6.5 to 7.0; 18 to 40 inches thick.
Subsoil Layers:	Grayish brown to reddish brown clay loam to loamy sand (a brown loam is common); massive; 0 to 50 percent rounded and subrounded gravel by volume; sticky to nonsticky, plastic to nonplastic; pH 6.5 to 7.2; greater than five feet thick.

MAPPING UNIT 40

Mapping Unit 40 consists of 70 percent or more of Landtype 40 and may have inclusions of Landtypes 5, 8, 30 and 39.

Landtype 40 occurs on nearly level glacial outwash plains and lake basins. Slope gradients are less than 10 percent. Elevation ranges from 3,000 to 3,200 feet. Precipitation is estimated at 25 to 35 inches per year. Subsurface drainage is an important source of moisture in the landtype.

Vegetation consists of mixed conifers, including Douglas-fir, white fir, western larch, lodgepole pine, and ponderosa pine over a variety of forbs, grasses, rushes, and shrubs. Productivity is estimated at cubic foot Site Class 3 to 4, and Site Index 45 to 60 for white fir.

This landtype has a moderately well to somewhat poorly drained soil formed from a thin to moderately thick layer of volcanic ash over glacial outwash and lacustrine deposits. Surface soils are typically sandy loam or loamy sand and subsoils are clay loam to sandy loam. Permeability is rapid in the surface soils and slow to rapid in the subsoils. A perched watertable is present during spring runoff.

Landtype 40 is similar to Landtype 30, but has finer textured subsoils and vegetation varies slightly. It is similar to Landtype 39, but is a wetter site and has different vegetation.

Range of Soil Characteristics of Landtype 40

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 3 inches thick.
Surface Layers:	Dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, subangular blocky to massive; 5 to 20 percent rounded and subrounded gravels by volume; nonsticky to slightly sticky; nonplastic to slightly plastic; pH 6.5 to 7.0; 15 to 30 inches thick.
Subsoil Layers:	Brown to gray clay loam to loamy sand; massive; 0 to 50 percent rounded and subrounded gravel by volume; sticky to nonsticky; plastic to nonplastic; pH 6.5 to 7.2; greater than five feet thick.

MAPPING UNIT 41

Mapping Unit 41 consists of 70 percent or more of Landtype 41 and may have inclusions of Landtypes 35, 42, 45 and 64.

Landtype 41 occurs on gentle to moderately sloping outwash plains. Slope gradients are 0 to 25 percent. Elevation ranges from 4,200 to 5,600 feet. Annual precipitation is estimated at about 18 to 25 inches.

Major vegetation consists of ponderosa pine, lodgepole pine, bitterbrush, manzanita, Idaho fescue, and Ross' sedge. Productivity is estimated at cubic foot Site Class 5 to 6, and Site Index 60 to 80 for ponderosa pine.

This landtype has well to excessively drained, coarse-textured soils derived from a moderately thick layer of pumice and volcanic ash over outwash sands and gravels. Surface soils are pumiceous loamy sands and sands, and buried sois are sandy loams over gravelly loamy sands and sands. Permeability is very rapid in the surface soil and rapid to very rapid in the buried soils.

Landtype 41 is similar to Landtype 37, but soils are coarse-textured and lodgepole pine is more common. It is similar to Landtype 42, but occurs at lower elevations and has different vegetation. Landtype 35 is similar, but occurs on steeper slopes and has less lodgepole pine. Landtype 41 is similar to Landtype 45, but the land is generally more sloping and ponderosa pine is more prevalent.

Range of Soil Characteristics of Landtype 41

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 2 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments and gravel; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 6 inches thick.
Sub-surface Layres:	Brown to brownish-yellow pumiceous loamy sand to sand; single grain to massive; 5 to 20 percent pumice and subrounded gravels by volume; nonsticky, nonplastic; pH 6.5 to 7.0; 18 to 36 inches thick.
Buried Soil:	Brown to grayish brown sandy loam to gravelly sand; massive to single grain; 20 to 70 percent rounded and subrounded gravels by volume; nonsticky, nonplastic; pH 6.5 to 7.0; greater than five feet thick.

Figure 6. This photo shows a portion of the outwash plain east of Wickiup Reservoir. The Deschutes River is in the lower left corner of the photo, as it meanders through this nearly level landform. Lodgepole pine is the dominant tree species on the outwash plains south of Bend. The soils are formed from a layer of pumice and volcanic ash over older waterlain deposits.



MAPPING UNIT 42

Mapping Unit 42 consists of 70 percent or more of Landtype 42 and may have inclusions of Landtypes 38, 41, 65 and 4A.

Landtype 42 occurs on gentle to moderately sloping glacial outwash plains. Slope gradients are 0 to 25 percent. Elevation ranges from 4,400 to 5,800 feet. Precipitation is estimated at 25 to 30 inches per year.

Vegetation consists of mixed conifers, including white fir, lodgepole pine, and ponderosa pine over snowbrush, manzanita, sedges, squirreltail, and a few forbs. Productivity is estimated at cubic foot Site Class 5 and Site Index 70 to 85 for ponderosa pine.

This landtype has well drained, coarse-textured soils derived from a moderately thick layer of volcanic ash and pumice over outwash gravels. Surface soils are pumiceous loamy sands and sands, and buried soils are sandy loams over gravelly loamy sands and sands. Permeability is very rapid in the surface soils and moderate to very rapid in the buried soils.

Landtype 42 is similar to Landtype 41, but occurs at higher elevations and has different vegetation. Landtype 65 is similar, but occurs on lavas instead of outwash gravels. Landtype 38 is similar, but occurs on steeper slopes.

Range of Soil Characteristics of Landtype 42

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 3 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments and gravel; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 6 inches thick.
Subsurface Layers:	Brown to brownish-yellow pumiceous loamy sand to sand; massive to single grain; 5 to 20 percent pumice and subrounded gravel by volume; nonsticky, nonplastic; pH 6.2 to 7.0; 18 to 36 inches thick.
Buried Soil:	Dark brown to grayish brown sandy loam to gravelly sand; massive to single grain; 20 to 70 percent subrounded gravel by volume; nonsticky, nonplastic; pH 6.5 to 7.0; some moderately compact material may be present; greater than five feet thick.

MAPPING UNIT 43

Mapping Unit 43 consists of 70 percent or more of Landtype 43 and may have inclusions of Landtypes 5, 8, 44, 45, 96 and 2B.

Landtype 43 occurs on nearly level outwash plains, commonly near drainages. Slope gradients are generally less than 5 percent. Elevation ranges from 4,200 to 4,600 feet. Annual precipitation is estimated at 20 to 40 inches.

Vegetation is composed dominantly of lodgepole pine, forbs, grasses, and sedges. Some spruce and bitterbrush may also be included. Productivity is estimated at cubic foot Site Class 5 to 6, and Site Index 30 to 45 for lodgepole pine.

Landtype 43 has poorly to somewhat poorly drained soils derived from a moderately thick to thick layer of volcanic ash, pumice, and alluvium over glacial outwash and lacustrine sediments. Surface soils are sandy loams to pumiceous sands, and buried soils are gravelly loams to gravelly loamy sands. Permeability is rapid to very rapid in the buried soils. A watertable is typically present within a depth of about two feet, and surface flooding is common during the spring runoff period.

Landtype 43 is similar to Landtype 44, but it is a wetter site and vegetation is different. It is similar to Landtype 8, but different vegetation, and the landform is slightly different.

Range of Soil Characteristics of Landtype 43

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 2 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb to granular structure; 0 to 15 percent pumice fragments and gravel; nonsticky, nonplastic; pH 6.0 to 6.8; 4 to 10 inches thick.
Sub-surface Layers:	Yellowish-brown to gray sandy loam to sand; massive to single grain; 2 to 30 percent pumice and subrounded gravels by volume; nonsticky, nonplastic; pH 6.2 to 6.8; 18 to 50 inches thick.
Buried Soil:	Dark brown to gray loam to gravelly sand; massive to single grain; 5 to 80 percent subrounded gravels by volume; sticky to nonsticky, sticky to nonplastic; pH 6.2 to 7.0; greater than five feet thick.

MAPPING UNIT 44

Mapping Unit 44 consists of 70 percent or more of Landtype 44 and may have inclusions of Landtypes 5, 43, 45 and 96.

Landtype 44 occurs on nearly level glacial outwash plains. Slope gradients are 0 to 5 percent. Elevation ranges from 4,200 to 4,600 feet. Precipitation ranges from 20 to 40 inches per year.

Dominant vegetation is lodgepole pine, bitterbrush, and forbs. Squirreltail, Idaho fescue, and bearberry may also be included. Dense lodgepole pine regeneration is typical on this landtype. Productivity is estimated at cubic foot Site Class 5 and Site Index 35 to 50 for lodgepole pine.

This landtype has moderately well to somewhat poorly drained soils derived from a moderately thick to thick layer of volcanic ash and pumice over glacial outwash and lacustrine sediments. Surface soils are pumiceous loamy sands and sands, and buried soils are loams to gravelly sands. Permeability is very rapid in the surface soil and moderate to very rapid in the buried soils. The watertable is generally encountered at a depth of 2 to 5 feet.

Landtype 44 is similar to Landtype 43, but it has better drainage. It is similar to Landtypes 45 and 96, but the watertable is closer to the surface and the ground vegetation varies.

Range of Soil Characteristics of Landtype 44

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.5 to 1.5 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments and gravel; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 6 inches thick.
Sub-surface Layers:	Brown to yellowish-brown pumiceous loamy sand to sand; single grain to massive; 5 to 40 percent pumice and subrounded gravel by volume; nonsticky; nonplastic; 18 to 55 inches thick.
Buried Soil:	Dark brown to gray loam to gravelly sand; massive to single grain; 5 to 80 percent subrounded gravels by volume; nonsticky to sticky; nonplastic to plastic; pH 6.0 to 7.0; greater than five feet.

MAPPING UNIT 45

Mapping Unit 45 consists of 70 percent or more of Landtype 45 and may have inclusions of Landtypes 15, 41, 43, 44, 46 and 63.

Landtype 45 occurs on nearly level glacial outwash plains. Slope gradients are less than 10 percent. Elevation ranges from 4,200 to 4,600 feet. Annual precipitation is estimated at 20 to 30 inches.

Vegetation is composed primarily of lodgepole pine, bitterbrush, and Idaho fescue. Squirreltail and Ross' sedge are also included as well as a few ponderosa pine. Productivity is estimated at cubic foot Site Class 5, and Site Index 40 to 50 for lodgepole pine.

This landtype has excessively to well drained soils derived from a moderately thick layer of volcanic ash and pumice over glacial outwash deposits and lacustrine sediments. Surface soils are pumiceous loamy sands and sands, and buried soils are loams to gravelly sands. Permeability is very rapid in the surface soil and moderate to very rapid in the buried soils. The watertable is typically greater than five feet from the surface.

Landtype 45 is similar to Landtype 44, but occurs on drier sites where the watertable is at greater depths. Landtype 63 is similar, but occurs on lava plains instead of on glacial outwash. Landtype 45 is similar to Landtype 46, but occurs at lower elevations and has Idaho fescue and more bitterbrush.

Range of Soil Characteristics of Landtype 45

Litter:	Needles, leaves, twigs, and decomposing organic mater; 0.5 to 1.5 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments and gravel; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 6 inches thick.
Sub-surface Layers:	Brown to brownish-yellow pumiceous loamy sand to sand; single grain to massive; 5 to 30 percent pumice and subrounded gravel by volume; nonsticky, nonplastic; 18 to 36 inches thick.
Buried Soil:	Dark brown to grayish brown loam to gravelly sand; massive to single grain; 5 to 80 percent subrounded gravels by volume; nonsticky to sticky; nonplastic to plastic; pH 6.0 to 7.0; greater than five feet thick.

MAPPING UNIT 46

Mapping Unit 46 consists of 70 percent or more of Landtype 46 and may have inclusions of Landtypes 15, 19, 28, 45, 65, and 70.

Landtype 46 occurs on gently sloping glacial outwash plains. Slope gradients are typically less than 10 percent. Elevation ranges from 4,300 to 4,700 feet. Precipitation is estimated at 25 to 35 inches per year.

The primary vegetation is composed of lodgepole pine, bitterbrush, needlegrass, squirreltail, and some sedges. Productivity is estimated at cubic foot Site Class 5 and Site Index 35 to 45 for lodgepole pine.

This landtype has excessively to well drained soils derived from a moderately thick layer of volcanic ash and pumice over glacial outwash. Surface soils are pumiceous loamy sands and sands, and buried soils are loams to gravelly loam sands. Permeability is very rapid in the surface soils and rapid to very rapid in the buried soils.

Landtype 46 is similar to Landtype 45, but occurs at higher elevations and has different ground cover. It is similar to Landtype 70, but occurs on outwash plains instead of lavas.

Range of Soil Characteristics of Landtype 46

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 1.5 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments and gravel; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 4 inches thick.
Sub-surface Layers:	Yellowish-brown to very pale brown loamy sand to sand; massive to single grain; 2 to 30 percent pumice and subrounded gravels by volume; nonsticky, nonplastic; pH 6.2 to 7.0; 18 to 36 inches thick.
Buried Soil:	Brown to grayish brown sandy loam to gravelly loamy sand; massive to single grain; 10 to 70 percent rounded and subrounded gravels by volume; nonsticky to slightly sticky; nonplastic to slightly plastic; pH 6.0 to 7.0; greater than five feet thick.

MAPPING UNIT 47

Mapping Unit 47 consists of 70 percent or more of Landtype 47 and may have inclusions of Landtypes 45, 46, and 63.

Landtype 47 occurs on gentle slopes on outwash plains, terraces, and beach ridges. Slope gradients are 0 to 25 percent, and slope lengths are short on over 15 percent gradients. Elevation ranges from 5,000 to 5,500 feet. Precipitation is estimated at 18 to 24 inches per year.

Primary vegetation consists of lodgepole pine over Idaho fescue. Productivity is estimated at cubic foot Site Class 6, and Site Index 30 to 35 for lodgepole pine.

This landtype has well to excessively drained soils derived from a thin to moderately thick layer of volcanic ash over waterlain sands and gravels. Surface soils are pumiceous loamy sands and buried soils are gravelly sandy loams and sands. Permeability is very rapid in the surface layers and rapid to very rapid in the buried soil.

Landtype 47 is similar to Landtypes 41 and 45 but differs in vegetation.

Range of Soil Characteristics of Landtype 47

Litter:	Needles, grass leaves, twigs, aud decomposing organic matter; 0 to 1 inch thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments and gravel; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 6 inches thick.
Sub-surface Layers:	Brown to yellowish brown sandy loam and loamy sand; single grain to massive; 2 to 15 percent subrounded gravel by volume; nonsticky, nonplastic; pH 6.5 to 7.0; 10 to 30 inches thick.
Buried Soil:	Brown to grayish brown sandy loam to gravelly loamy sand; massive to single grain; 20 to 70 percent rounded and subrounded gravel by volume; slightly sticky to nonsticky, slightly plastic to nonplastic; pH 6.5 to 7.2; greater than 3 feet thick.

MAPPING UNIT 48

Mapping Unit 48 consists of 70 percent or more of Landtype 48 and may have inclusions of Landtypes 36, 49, 72, and 6C.

Landtype 48 occurs on gently sloping lake basins or outwash plains. Slope gradients are 0 to 20 percent. Elevation ranges from 3,400 to 5,000 feet. Annual precipitation is estimated at 8 to 12 inches.

Vegetation consists of sagebrush, rabbitbrush, Idaho fescue, cheatgrass, and a few scattered ponderosa pine and juniper.

This landtype has excessively drained soils derived from a thin to moderately thick layer of volcanic ash over waterlain sands and gravels. Surface soils are sandy loams and subsoils are sands and gravelly sands. Permeability is very rapid in both the surface soils and the subsoils.

Landtype 48 is similar to Landtype 49 but has gentler slopes. It is similar to Landtype 6C but underlying materials are sands and gravels instead of hard rock. Landtype 48 is similar to Landtype 36 but occurs at lower elevations and vegetation is different.

Range of Soil Characteristics of Landtype 48

Litter:	Leaves, twigs, and decomposing organic matter; 0 to 0.5 inches thick.
Surface Layers:	Dark grayish brown to brown sandy loam to loamy sand; weak, medium, granular structure to massive or single grain; 2 to 10 percent subrounded and rounded gravel fragments by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.5 to 7.2; 15 to 40 inches thick.
Subsoil Layers:	Dark gray to pale brown sand to gravelly sand; single grain; 20 to 70 percent rounded and subrounded gravel fragments by volume; nonsticky, nonplastic; pH 6.8 to 7.5; greater than 3 feet thick.

Local deposits of finer textured subsoils may be found in this landtype, as well as some coarse pumice at the surface.

MAPPING UNIT 49

Mapping Unit 49 consists of 70 percent or more of Landtype 49 and may have inclusions of Landtypes 10, 48, and 91.

Landtype 49 occurs on steep slopes along drainage dissections of outwash plains or old beach ridges. Slope gradients are 20 to 50 percent. Elevation ranges from 4,500 to 4,900 feet. Annual precipitation is estimated at 8 to 12 inches.

Vegetation consists of sagebrush, rabbitbrush, Idaho fescue, needlegrass, cheatgrass, and a few ponderosa pine and juniper.

This landtype has excessively drained soils formed from a thin to moderately thick layer of volcanic ash over waterlain sands and gravels. Surface soils are sandy loams and loamy sands and subsoils are sands and gravelly sands. Permeability is very rapid in the surface soil and very rapid in the subsoil.

Landtype 49 is similar to Landtype 48 but occurs on steeper slopes. It is similar to Landtype 91 but is underlain by sands and gravels instead of bedrock.

Range of Soil Characteristics of Landtype 49

Litter:	Leaves, twigs, and decomposing organic matter; 0 to 0.5 inches.
Surface Layers:	Dark grayish brown to brown sandy loam to loamy sand; weak, medium, granular structure to massive or single grain; 2 to 20 percent rounded and subrounded gravel fragments by volume; nonsticky, nonplastic; pH 6.5 to 7.2; 10 to 30 inches thick.
Subsoil Layers:	Dark gray to pale brown sand to sandy gravel; single grain; 20 to 70 percent rounded and subrounded gravel fragments by volume; nonsticky, nonplastic; pH 6.8 to 7.5; greater than 3 feet thick.



MAPPING UNIT 50

Mapping Unit 50 consists of 70 percent or more of Landtype 50 and may have inclusions of Landtype 51, 53, 55, and 78.

Landtype 50 occurs on steep side slopes of dissected canyons. Slope gradients are 30 to 70 percent and aspects are generally southerly. Elevation ranges from 2,300 to 4,500 feet. Annual precipitation is estimated at 12 to 20 inches.

Vegetation includes ponderosa pine and juniper over bitterbrush, sagebrush, arrowleaf balsamroot, Idaho fescue, and cheatgrass. Areas with no vegetation on very shallow soils or exposed tuff bedrock are common in this landtype. This landtype has low potential for timber production.

This landtype has excessively drained soils derived from a thin layer of volcanic ash over residuum from tuffs and other volcanic sediments. Surface soils are sandy loam to loam and subsoils are generally loams. Permeability is rapid in the surface soil and moderate in the subsoil. Depth to bedrock is 6 to 30 inches.

Bedrock consists of incompetent, soft to moderately hard tuffs. Colors are dark brown to very pale brown. Inclusions of hard andesites and basalts are present.

Landtype 50 is similar to Landtype 51 but is a poorer site and generally occurs at lower elevations. It is similar to Landtype 53 but the slopes are steeper.

Range of Soil Characteristics of Landtype 50

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 1 inch.
Surface Layers:	Black to light brown sandy loam to loam; moderate, medium, granular structure to massive; 5 to 20 percent angular to subangular gravel fragments by volume; slightly sticky, slightly plastic; pH 6.5 to 7.2; 6 to 15 inches thick.
Subsoil Layers:	Reddish brown to brown loam to clay loam; moderate, fine, subangular blocky to massive; 5 to 40 percent subangular to angular gravel and cobbles by volume; slightly sticky to sticky, slightly plastic to plastic; pH 6.5 to 7.2; 6 to 20 inches thick.

MAPPING UNIT 51

Mapping Unit 51 consists of 70 percent or more of Landtype 51 and may have inclusions of Landtypes 50, 52, and 78.

Landtype 51 occurs on steeply sloping, smooth to slightly dissected canyon walls. Aspects are typically southerly and slope gradients are 30 to 60 percent. Elevation ranges from 2,400 to 3,800 feet. Precipitation is estimated at 18 to 25 inches per year.

Vegetation includes ponderosa pine with some Douglas-fir and incense cedar over manzanita, bitterbrush, Idaho fescue, arrowleaf balsamroot, and needlegrass. Some snowbrush may be present at the upper elevation range. Productivity is estimated at cubic foot Site Class 5 to 6, and Site Index 60 to 80 for ponderosa pine.

This landtype has well to excessively drained soils derived from a thin to moderately thick layer of volcanic ash over residuum from tuffs and other volcanic rocks. Surface soils are sandy loams and subsoils are loams. Permeability is very rapid in the surface soil and rapid to moderate in the subsoil. Depth to bedrock is 18 to 40 inches.

Bedrock consists of moderately hard tuffs, compact pumice deposits, and other volcanic rocks. It is mostly incompetent. Inclusions of hard andesites and basalts are present.

Landtype 51 is similar to Landtype 52 but varies in aspect and vegetation. It is similar to Landtype 78 but is underlain by softer bedrock materials.

Range of Soil Characteristics of Landtype 51

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 2 inches thick.
Surface Layers:	Dark grayish brown to brown sandy loam to loam; weak, fine, granular structure to massive; 5 to 15 percent subangular blocky gravels and cobbles by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.5 to 7.0; 6 to 20 inches thick.
Subsoil Layers:	Dark reddish brown to pale brown loam to clay loam; moderate, medium subangular blocky to massive; 5 to 50 percent subangular to angular blocky gravels, cobbles, and stones by volume; pH 6.5 to 7.0; 12 to 24 inches thick.

MAPPING UNIT 52

Mapping Unit 52 consists of 70 percent or more of Landtype 52 and may have inclusions of Landtypes 51, 62, and 79.

Landtype 52 occurs on steeply sloping, smooth to slightly dissected side slopes of drainage dissections or canyon walls. Aspects are typically northerly and slope gradients are 30 to 60 percent. Elevation ranges from 2,400 to 3,800 feet. Annual precipitation is estimated at 18 to 25 inches.

Vegetation is made up of mixed conifers including Douglas-fir, white fir, ponderosa pine, and larch over snowbrush, chinquapin, manzanita, sedges, and princess pine. Productivity is estimated at cubic foot Site Class 5, and Site Index 80 to 100 for Douglas-fir. Site Index is 70 to 90 for ponderosa pine and the cubic foot Site Class is 4 to 5.

This landtype has well drained soils derived from a thin to moderately thick layer of volcanic ash over residuum from tuffs and other pyroclastics. Surface soils are sandy loams and loamy sands and subsoils are typically loams. Permeability is rapid to very rapid in the surface soil and moderate to rapid in the suhsoil. Depth to bedrock is 20 to 50 inches.

Bedrock consists of incompetent, moderately hard to soft tuffs and other pyroclastics with inclusions of hard basalts and andesites.

Landtype 52 is similar to Landtype 79 but occurs primarily on tuffs instead of hard andesites. It is similar to Landtype 51 but occurs on different aspects and varies in vegetative composition.

Range of Soil Characteristics of Landtype 52

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 2 inches thick.
Surface Layers:	Black to dark hrown sandy loam to loamy sand; weak, fine, crumb structure to massive; 2 to 15 percent subangular blocky gravels and cobbles by volume; nonsticky, nonplastic; pH 6.2 to 7.0; 8 to 20 inches thick.
Subsoil Layers:	Dark reddish brown to brown loam to clay loam; moderate, medium, subangular blocky structure to massive; 10 to 50 percent subrounded to angular blocky gravels, cobbles, and stones by volume; sticky to slightly sticky, plastic to slightly plastic; pH 6.0 to 7.0; 12 to 30 inches thick.

MAPPING UNIT 53 - Juniper Flats; Scab Flats

Mapping Unit 53 consists of 70 percent or more of Landtype 53 and may have inclusions of Landtypes 55 and 61.

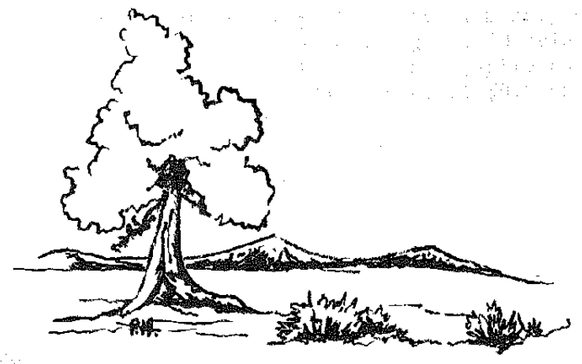
Landtype 53 occurs on flats and ridgetops, and includes lands known as "scabflats." Slope gradients are 0 to 20 percent, but are typically under 15 percent. Elevation ranges from 2,300 to 4,400 feet. Annual precipitation is estimated at 10 to 15 inches.

Vegetation includes low density juniper and ponderosa pine over cheatgrass, sagebrush, tarweed, and some Idaho fescue. Ponderosa pine does not occur at the lower elevation limits. This is a very low quality to unproductive site for timber production.

This landtype has very shallow to shallow soils formed from volcanic ash and residuum from a variety of volcanic rocks. Surface erosion is quite evident. Soils are variable, but often have a very thin loam to sandy loam surface over a loam to clay loam subsoil. Permeability is rapid to slow and limited by bedrock. Depth to bedrock is 0 to 30 inches.

Bedrock ranges from competent andesites and basalts to incompetent tuffs. It is generally massive with few fractures resulting in saturated soils and surface runoff during wet periods.

Landtype 53 is similar to Landtype 60, but the soils are shallower.



MAPPING UNIT 54

Mapping Unit 54 consists of 70 percent or more of Landtype 54 and may have inclusions of Landtypes 52, 55, 61, and 62.

Landtype 54 occurs on gentle, to moderately sloping broad ridgetops and benches. Slope gradients are commonly 5 to 10 percent but range from 0 to 30 percent. Elevation ranges from 3,300 to 4,400 feet. Annual precipitation is estimated at 18 to 25 inches.

Vegetation includes mixed conifers such as ponderosa pine, Douglas-fir, white fir, and incense cedar. Shrubs and ground plants may include snowbrush, ocean spray, manzanita, peavine, and a variety of other forbs and grasses. Productivity is estimated at cubic foot Site Class 5, and Site Index 70 to 85 for ponderosa pine.

This landtype has well drained soils derived from a thin to moderately thick layer of volcanic ash over residuum from tuffs, breccias, and other pyroclastic rocks. Surface soils are typically sandy loams and subsoils are loams. Permeability is rapid to very rapid in the surface soil and moderate in the subsoil. Depth to bedrock is 20 to 48 inches.

Bedrock consists of incompetent, moderately hard to soft tuffs and breccias with inclusions of hard andesites and basalts.

Landtype 54 is similar to Landtype 62 but differs in respect to bedrock materials. It is similar to 55 but generally occurs at high elevations and has different vegetation. Landtype 52 is similar but occurs on steeper slopes.

Range of Soil Characteristics of Landtype 54

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 2 inches thick.
Surface Layers:	Black to dark brown sandy loam to loamy sand; weak, fine, crumb structure to massive; 2 to 15 percent subangular blocky gravels and cobbles by volume; nonsticky, nonplastic; pH 6.0 to 7.0; 8 to 18 inches thick.
Subsoil Layers:	Dark reddish brown to pale brown loam to clay loam; moderate, medium, subangular blocky structure to massive; 10 to 50 percent subrounded to subangular blocky gravels, cobbles, and stones by volume; pH 6.0 to 7.0; 12 to 30 inches thick.

MAPPING UNIT 55

Mapping Unit 55 consists of 70 percent or more of Landtype 55 and may have inclusions of Landtypes 51, 53, 54, and 61.

Landtype 55 occurs on gentle to moderately sloping broad ridgetops and benches. Slope gradients range from 0 to 30 percent but are typically 5 to 15 percent. Elevation ranges from 2,500 to 3,500 feet. Precipitation is estimated at 12 to 18 inches per year.

Vegetation is dominated by ponderosa pine, bitterbrush, manzanita, and Idaho fescue. Some Douglas-fir and incense cedar are also included as well as cheatgrass and arrowleaf balsamroot. Productivity is estimated at cubic foot Site Class 5 to 6 and Site Index 60 to 75 for ponderosa pine.

This landtype has well drained, shallow to moderately deep soils derived from volcanic ash and residuum. Surface soils are typically sandy loams and subsoils are loams. Permeability is rapid in the surface soil and moderate in the subsoil. Depth to bedrock is 20 to 40 inches.

Bedrock consists of incompetent, moderately hard to soft tuffs and breccias with inclusions of hard andesites and basalts.

Landtype 55 is similar to Landtype 51 but does not have as steep of slopes. It is similar to 61 but has different bedrock materials. Landtype 55 is similar to Landtype 54 except for vegetation and it usually occurs at lower elevations.

Range of Soil Characteristics of Landtype 55

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches.
Surface Layers:	Dark grayish brown to brown sandy loam; weak, fine, granular structure to massive; 5 to 15 percent subangular blocky to platy gravels, cobbles, and stones by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.5 to 7.0; 6 to 15 inches thick.
Subsoil Layers:	Reddish brown to pale brown loam to clay loam; moderate, medium, subangular blocky structure to massive; 5 to 50 percent subrounded to platy gravels, cobbles, and stones by volume; pH 6.0 to 7.0; 12 to 24 inches thick.

MAPPING UNIT 56

Mapping Unit 56 consists of 70 percent or more of Landtype 56 and may have inclusions of Landtypes 36, 37, 64, and 6A.

Landtype 56 occurs on gently to moderately sloping uplands. Slope gradients are 0 to 30 percent. Elevation ranges from 4,000 to 4,500 feet. Precipitation is estimated at 14 to 20 inches per year.

Vegetation includes ponderosa pine, bitterbrush, manzanita, squaw currant, rabbitbrush, Idaho fescue, cheatgrass, needlegrass, and squirreltail. Some juniper is included at the lower elevation range. Productivity is estimated at cubic foot Site Class 5 to 6 and Site Index 60 to 75 for ponderosa pine.

This landtype has excessively drained soils derived from a moderately thick layer of pumiceous volcanic ash over tuffs, breccias, and coarse pumice deposits. Surface soils are pumiceous loamy sands and subsoils are sandy loams and gravelly loamy sands. Permeability is very rapid in the surface soils and very rapid to rapid in the buried soil. Depth to bedrock is 24 to 50 inches.

Bedrock consists of moderately hard tuffs and breccias to soft, compact pumice. Colors vary from dark gray to nearly white. Most of these materials appear to be water deposited.

Landtype 56 is similar to Landtype 55 but the soils are coarser textured. It is similar to Landtypes 37, 64, and 6A but underlying materials are different.

Range of Soil Characteristics of Landtype 56

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 6 inches thick.
Subsurface Layers:	Yellowish brown to brown sandy loam to sand; massive to single grain; 5 to 15 percent pumice and subrounded to subangular blocky gravel by volume; nonsticky, nonplastic; pH 6.5 to 7.0; 12 to 30 inches thick.
Buried Soil:	Brown to pale brown sandy loam to gravelly, pumiceous loamy sand; massive to single grain; 20 to 70 percent pumice and subrounded to subangular blocky gravels and cobbles by volume; nonsticky, nonplastic; pH 6.5 to 7.0; 6 to 20 inches thick.

MAPPING UNIT 57

Mapping Unit 57 consists of 70 percent or more of Landtype 57 and may hhave inclusions of Landtypes 50, 56, 58, and 68.

Landtype 57 occurs along steep, smooth to slightly dissected side slopes of ridges. Slope gradients are 30 to 60 percent and aspects are typically southerly. Elevation ranges from 4,500 to 5,000 feet. Annual precipitation is estimated at 20 to 30 inches.

Dominant vegetation includes ponderosa pine, manzanita, bitterbrush, and Ross' sedge. Some snowbrush and white fir may be present at the upper elevation range. Productivity is estimated at cubic foot Site Class 5 to 6 and Site Index 60 to 80 for ponderosa pine.

This landtype has excessively drained soils derived from a moderately thick layer of pumice and volcanic ash over residuum from tuffs and breccias and some colluvium. Surface soils are pumiceous loamy sands and sands and buried soils are sandy loams to loamy sands. Permeability is very rapid in the surface soil and very rapid to rapid in the subsoil. Depth to bedrock is 20 to 50 inches.

Bedrock consists of moderately hard to hard, massive to slightly fractured tuffs and breccias. It is usually light colored and pumiceous.

Landtype 57 is similar to Landtype 51 but the soils are coarser textured. It is similar to Landtype 68 except it lies on tuffs and breccias instead of hard basalts and andesites.

Range of Soil Characteristics of Landtype 57

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 2 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments and gravel; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 6 inches thick.
Surface Layers:	Brown to brownish yellow loamy sand to sand; massive to single grain; 5 to 20 percent pumice by volume; nonsticky, nonplastic; pH 6.4 to 7.0; 18 to 30 inches thick.
Buried Soil:	Brown to yellowish brown sandy loam to loamy sand; massive; 5 to 40 percent pumice and tuff fragments by volume, some large boulders at toeslopes; nonsticky, nonplastic; pH 6.5 to 7.0; 0 to 20 inches thick.

MAPPING UNIT 58

Mapping Unit 58 consists of 70 percent or more of Landtype 58 and may have inclusions of Landtypes 51 and 69.

Landtype 58 occurs on steeply sloping, smooth to slightly dissected sideslopes of ridges. Aspects are typically northerly and slope gradients are 30 to 60 percent. Elevation ranges from 4,500 to 5,000 feet. Annual precipitation is estimated at 20 to 30 inches.

Vegetation includes mixed conifers composed of ponderosa pine, white fir, lodgepole pine, and some Douglas-fir over snowbrush, manzanita, sedges, and a few forbs and grasses. Productivity is estimated at cubic foot Site Class 5 and Site Index 70 to 85 for ponderosa pine.

This landtype has well to excessively drained soils derived from a moderately thick layer of pumice and volcanic ash over residuum and colluvium from tuffs and breccias. Surface soils are typically loamy sands and buried soils are sandy loams. Permeability is very rapid in the surface soil and rapid to very rapid in the buried soil. Depth to bedrock is 20 to 50 inches.

Bedrock consists of moderately hard to hard, light colored tuffs and breccias. They are incompetent and slightly fractured.

Landtype 58 is similar to Landtype 57 but varies in aspect and vegetation. Landtype 52 is similar but the soils are finer textured.

Range of Soil Characteristics of Landtype 58

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 3 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 6 inches thick.
Sub-surface Layers:	Brown to yellowish brown loamy sand to sand; massive to single grain; 5 to 20 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.2 to 7.0; 20 to 36 inches thick.
Buried Soil:	Brown to brownish yellow sandy loam to sand; massive to single grain; 2 to 40 percent pumice and tuff coarse fragments by volume; nonsticky, nonplastic; pH 6.0 to 7.0; 0 to 20 inches thick.

MAPPING UNIT 59

Mapping Unit 59 consists of 70 percent or more of Landtype 59 and may have inclusions of Landtypes 10, 57, and 68.

Landtype 59 occurs on steeply sloping, smooth to slightly dissected slopes of canyon walls of drainage dissections. Aspects are typically southerly and slope gradients are 30 to 80 percent. Elevation ranges from 3,700 to 4,700 feet. Precipitation is estimated at 13 to 20 inches per year.

Vegetation includes ponderosa pine, juniper, bitterbrush, manzanita, rabbitbrush, Idaho fescue, and associated lesser species. Productivity is estimated at cubic foot Site Class 5 to 6 and Site Index 50 to 70 for ponderosa pine.

This landtype has excessively drained soils derived from a moderately thick layer of pumiceous volcanic ash over residuum and colluvium from tuffs, breccias, and coarse pumice beds. Rock outcrops of hard andesite and basalt are common along the upper breaks of the slopes. Surface soils are loamy sands and buried soils are typically sandy loams. Permeability is very rapid in the surface soil and rapid in the buried soil. Depth to bedrock is 18 to 50 inches.

Bedrock is composed of stratified volcanics including soft to hard tuffs and breccias, hard basalts, and coarse pumice. Most of the materials are incompetent. Colors include nearly white, light pink, grays, and yellowish brown.

Landtype 59 is similar to Landtypes 51 and 50 only the soils are coarser textured. It is similar to 57 but the landform is slightly different and bedrock materials are more varied.

Range of Soil Characteristics of Landtype 59

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 2 inches.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments and gravel; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 6 inches thick.
Sub-surface Layers:	Brown to yellowish brown loamy sand to sand; massive to single grain; 5 to 20 percent pumice and subangular blocky gravel to boulders by volume; nonsticky, nonplastic; pH 6.5 to 7.0; 15 to 30 inches thick.
Buried Soil:	Dark brown to brown sandy loam to sand; massive to single grain; 20 to 50 percent subangular blocky gravel to boulders by volume; nonsticky, nonplastic; pH 6.2 to 7.2; 0 to 30 inches thick.

MAPPING UNIT 60

Mapping Unit 60 consists of 70 percent or more of Landtype 60 and may have inclusions of Landtypes 11, 61, 6C, 72, and 78.

Landtype 60 occurs on gently sloping to uneven lava plains with slopes ranging from 0 to 30 percent but typically less than 15 percent gradient. Lava rock outcrops are common. Elevation ranges from 3,200 to 3,600 feet north of Sisters and from 4,800 to 5,300 feet on the southeast part of the Fort Rock District. Annual precipitation is estimated at 12 to 16 inches.

Vegetation includes ponderosa pine, juniper, bitterbrush, sagebrush, rabbitbrush, Idaho fescue, and cheatgrass. Productivity is estimated at cubic foot Site Class 6 and Site Index 40 to 60 for ponderosa pine.

This landtype has well to excessively drained soils derived from a thin to moderately thick layer of volcanic ash over residuum or basalts and andesites. Mixing of the ash and residuum is common. Surface soils are typically sandy loams and subsoils are loams. Permeability is very rapid to rapid in the surface soil and rapid in the subsoil. Depth to bedrock is 18 to 40 inches.

Bedrock consists of moderately fractured, hard basalts and andesites. They are competent, and black to dark gray in color.

Landtype 60 is similar to Landtype 6C, except it usually occurs at higher elevations and has different vegetation. It is similar to Landtype 72 but the soils are finer textured.

Range of Soil Characteristics of Landtype 60

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 1 inch.
Surface Layers:	Black to brown sandy loam to loamy fine sand; weak, fine, granular structure to massive; 2 to 25 percent angular and subangular blocky gravel, cobbles, and stones; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.5 to 7.2; 6 to 20 inches thick.
Subsoil Layers:	Dark brown to brown loam to sandy loam; massive; 20 to 60 percent subangular and angular blocky cobbles and stones; sticky to nonsticky, plastic to nonplastic; pH 6.5 to 7.2; 10 to 24 inches thick.

MAPPING UNIT 61

Mapping Unit 61 consists of 70 percent or more of Landtype 61 and may have inclusions of Landtypes 14, 53, 55, 62, and 78.

Landtype 61 occurs on gently sloping uplands and benches. Slopes are commonly 5 to 10 percent but range up to about 20 percent. Elevation ranges from 3,200 to 4,500 feet, and the annual precipitation is estimated at 15 to 22 inches.

Vegetation includes ponderosa pine, incense cedar, and minor amounts of Douglas-fir over bitterbrush, manzanita, Idaho fescue, squaw carpet, cheatgrass, peavine, and arrowleaf balsamroot. Productivity is estimated at cubic foot Site Class 5 to high 6 and Site Index 60 to 80 for ponderosa pine.

This landtype has well drained soils derived from a thin to moderately thick layer of volcanic ash over residuum from andesites and basalts. Surface soils are typically sandy loams and subsoils are loams. Permeability is rapid in the surface soil and rapid to moderate in the subsoil. Depth to bedrock is 20 to 40 inches.

Bedrock consists primarily of hard, gray, moderately fractured andesites or basalts. The bedrock is competent.

Landtype 61 is similar to Landtype 64 but has finer textured soils and the vegetation varies slightly. It is similar to Landtype 71 but slopes are not as long and smooth, nor as steep. Landtype 61 is similar to Landtype 62 except the vegetation is different and the soils tend to be shallower. Landtype 55 is similar except for the type of bedrock.

Range of Soil Characteristics of Landtype 61

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 2 inches thick.
Surface Layers:	Dark grayish brown to reddish brown sandy loam; weak, fine, or crumb structure to massive; 5 to 20 percent subangular to subrounded gravel, cobbles, and stones by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.4 to 7.0; 10 to 24 inches thick.
Subsoil Layers:	Dark reddish brown to brown loam to sandy loam; massive to moderate, medium, subangular block structure; 20 to 60 percent subrounded to subangular blocky gravels, cobbles, and stones by volume; slightly sticky to sticky, slightly plastic to plastic; pH 6.5 to 7.0; 10 to 24 inches thick.

MAPPING UNIT 62

Mapping Unit 62 consists of 70 percent or more of Landtype 62 and may have inclusions of Landtypes 54, 61, and 79.

Landtype 62 occurs on gently sloping uplands and benches. Slope gradients are typically 5 to 10 percent but may range up to 30 percent for short distances. Elevation ranges from 3,700 to 4,500 feet, and the annual precipitation is estimated at 22 to 30 inches.

Vegetation is composed of mixed conifers including white fir, Douglas-fir, ponderosa pine, larch, and incense cedar. Shrubs and ground plants are quite varied and may include snowbrush, oceanspray, currant, pinegrass, Latherus, and many other forbs and grasses. Productivity is estimated at cubic foot Site Class 4 to 5 and Site Index 75 to 90 for ponderosa pine.

This landtype has well drained, moderately deep to deep, soils derived from a thin to moderately thick layer of volcanic ash over residuum from andesites. Surface soils are typically sandy loams and subsoils are loams. Permeability is rapid in the surface soil and moderate in the subsoil. Depth to bedrock is 20 to 50 inches.

Bedrock is composed of hard, gray colored andesites. It ranges from platy to subangular blocky and is moderately fractured. Most of the material is competent.

Landtype 62 is similar to Landtype 61 but has different vegetation and the soils are generally deeper. It is similar to Landtype 54 but differs in the type of bedrock. Landtype 79 is similar but occurs on steeper slopes.

Range of Soil Characteristics of Landtype 62

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 3 inches.
Surface Layers:	Dark brown sandy loam, weak, fine, granular structure to massive, 2 to 15 percent platy to subrounded gravel and cobbles by volume; nonsticky to slightly sticky, nonplastic to plastic; pH 6.2 to 6.8; 12 to 30 inches thick.
Subsoil Layers:	Reddish brown to brown loam to clay loam; moderate, medium, subangular blocky structure to massive; 15 to 50 percent subrounded to platy gravel, cobbles, and stones by volume, slightly sticky to sticky, slightly plastic to plastic; pH 6.0 to 7.0; 12 to 36 inches thick.



MAPPING UNIT 63

Mapping Unit 63 consists of 70 percent or more of Landtype 63 and may have inclusions of Landtypes 15, 45, 64, and 70.

Landtype 63 occurs on gently sloping lava plains. Slope gradients are generally less than 10 percent. Elevation ranges from 4,200 to 5,200 feet, and the annual precipitation is estimated at 18 to 25 inches.

Vegetation is composed primarily of lodgepole pine, bitterbrush, Idaho fescue, needlegrass, and squirreltail. A few ponderosa pine may be present. Productivity is estimated at cubic foot Site Class 5 and Site Index 40 to 50 for lodgepole pine.

This landtype has well to excessively drained soils derived from a moderately thick layer of pumice and volcanic ash over a thin residual soil on basalts. Surface soils are typically pumiceous loamy sands and sands, and buried soils are sandy loams. Permeability is very rapid in the surface soils and rapid to very rapid in the buried soil. Depth to bedrock is 24 to 60 inches.

Bedrock consists of hard, dark gray to black, highly to moderately fractured basaltic lavas. It has subangular to angular blocky fragments and is competent.

Landtype 63 is similar to Landtype 45 but differs in type of underlying materials. It is similar to Landtype 70 except for differences in ground vegetation and it usually occurs at lower elevations.

Range of Soil Characteristics of Landtype 63

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.5 to 1 inch thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments and gravel; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 6 inches thick.
Sub-surface Layers:	Dark brown to yellowish brown loamy sand to sand; single grain to massive; 2 to 20 percent pumice fragments and subangular blocky gravels and cobbles by volume; nonsticky, nonplastic; pH 6.0 to 6.8; 20 to 40 inches thick.
Buried Soil:	Strong brown to brown loamy fine sand to loam; massive; 30 to 60 percent subangular and angular blocky gravels, cobbles, and stones by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.0 to 7.0; 4 to 20 inches thick.

MAPPING UNIT 64

Mapping Unit 64 consists of 70 percent or more of Landtype 64 and may have inclusions of Landtypes 14, 63, 64, 76, 6G, 6A, and 6B.

Landtype 64 occurs on gentle to uneven lava plains. Slopes are typically convex, complex, and range from 0 to 30 percent gradient with 8 to 15 percent being the most common. Rock outcrops are common in this landtype. Elevation ranges from 3,400 to 5,500 feet, and the annual precipitation is estimated at 16 to 25 inches.

Vegetation includes ponderosa pine, manzanita, bitterbrush, rabbitbrush, currant, Idaho fescue, squirreltail, and Ross' sedge. Productivity is estimated at cubic foot Site Class 5 and Site Index 70 to 85 for ponderosa pine.

This landtype has well to excessively drained soils derived from a moderately thick layer of pumice and volcanic ash over an older soil on basaltic lavas. Surface soils are typically pumiceous loamy sands and sands, and buried soils are sandy loams. Permeability is very rapid in the surface soil and rapid in the buried soil. Depth to bedrock is 24 to 60 inches.

Bedrock consists of hard, black to dark gray basalts. It is highly to moderately fractured with subangular or angular blocky fragments. The materials are competent.

Landtype 64 is similar to Landtype 6A but occurs at higher elevations and has different vegetation. It is similar to 6B but does not have as much lodgepole pine present. Landtype 65 is similar but occurs at higher elevations and has different vegetation. Landtype 66 is similar but has single slopes instead of complex slopes.

Range of Soil Characteristics of Landtype 64

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 2 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice and gravel fragments; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 6 inches thick.
Sub-surface Layers:	Dark brown to yellowish brown pumiceous loamy sand to coarse sand; massive to single grain; 2 to 20 percent pumice coarse fragments and subangular blocky gravels and cobbles by volume; nonsticky, nonplastic; pH 6.2 to 7.0; 18 to 36 inches thick.
Buried Soil:	Brown loamy fine sand to loam; massive; 20 to 60 percent subangular blocky gravels, cobbles, and stones by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.4 to 6.8; 4 to 24 inches thick.

MAPPING UNIT 65

Mapping Unit 65 consists of 70 percent or more of Landtype 65 and may have inclusions of Landtypes 14, 25, 42, 64, 74, 6B, and 6H.

Landtype 65 occurs on uneven lava plains. Slopes are convex, complex, and range from 0 to 30 percent gradient with 10 to 20 percent slopes being most common. Elevation ranges from 4,500 to 5,800 feet, and the annual precipitation is estimated at 25 to 35 inches per year.

Vegetation is composed primarily of mixed conifers including white fir, ponderosa pine, and lodgepole pine over snowbrush and sedges. Some manzanita, bitterbrush, squirreltail, and a few forbs may also be present. Productivity is estimated at cubic foot Site Class 4 to 5 and Site Index 75 to 95 for ponderosa pine.

This landtype has well to excessively drained soils derived from a moderately thick layer of pumice and volcanic ash over residual soils on basaltic lavas. Surface soils are pumiceous loamy sands and sands, and buried soils are typically sandy loams. Permeability is very rapid in the surface soil and rapid to very rapid in the buried soil. Depth to bedrock is 24 to 60 inches.

Bedrock consists of hard, black to dark gray, basaltic lava. It is highly to moderately fractured wih angular to subangular blocky fragments. The material is competent.

Landtype 65 is similar to Landtype 64 but occurs at higher elevations and has different vegetation. It is similar to Landtype 67 with the exception of slope shape and minor differences in bedrock. Landtype 74 has similar vegetation but the soils are much stonier than in Landtype 65.

Range of Soil Characteristics of Landtype 65

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 3 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 2 to 15 percent pumice coarse fragments; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 6 inches thick.
Sub-surface Layers:	Dark brown to yellowish brown pumiceous loamy sand and sand; massive to single grain; 2 to 20 percent pumice and subangular blocky gravel and cobbles by volume; nonsticky, nonplastic; pH 6.0 to 7.0; 18 to 36 inches thick.
Buried Soil:	Brown to dark brown loamy fine sand to loam; massive; 20 to 70 percent subangular and angular gravels, cobbles, and stones by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.0 to 7.0; 6 to 24 inches thick.

MAPPING UNIT 66

Mapping Unit 66 consists of 70 percent or more of Landtype 66 and may have inclusions of Landtypes 64, 67, 68, and 6J.

Landtype 66 occurs on gentle to moderately sloping, single slopes, usually on benches or toeslopes of buttes. Slope gradients are 0 to 30 percent, with 15 to 20 percent being common. Aspects are typically southerly. Elevation ranges from 4,000 to 5,500 feet and the annual precipitation is estimated at 18 to 30 inches.

Vegetation includes ponderosa pine, bitterbrush, manzanita, Idaho fescue, squirreltail, needlegrass, and Ross's sedge. Productivity is estimated at cubic foot Site Class 5 and Site Index 65 to 85 for ponderosa pine.

This landtype has well to excessively drained soils derived from a moderately thick layer of pumice and volcanic ash over residuum and colluvium. Surface soils are typically loamy sands and sands, and buried soils are sandy loams. Permeability is very rapid in the surface soils and rapid in the buried soil. Depth to bedrock is 24 to 60 inches.

Bedrock consists of hard basalts, andesites, or rhyolites. Colors may range from black to reddish brown. The fragment shapes are often platy, but subangular and angular blocky is also included. Degree of fracturing ranges from highly fractured to moderate. The materials are competent.

Landtype 66 is similar to Landtype 64 except for slope shape and some differences in bedrock composition. It is similar to Landtype 67 except for vegetation and aspect. Landtype 97 is similar only the soils are thicker and coarser textured than in Landtype 66.

Range of Soil Characteristics of Landtype 66

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 2 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 2 to 15 percent pumice coarse fragments; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 8 inches thick.
Sub-surface Layers:	Brown to brownish yellow loamy sand to pumiceous sand; massive to single grain; 2 to 30 percent pumice coarse fragments and subangular blocky gravels and cobbles by volume; nonsticky, nonplastic; pH 6.2 to 7.0; 18 to 36 inches thick.
Buried Soil:	Brown loamy fine sand to loam; massive; 20 to 70 percent subangular blocky to platy gravels, cobbles, and stones by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.4 to 7.0; 4 to 30 inches thick.

MAPPING UNIT 67

Mapping Unit 67 consists of 70 percent or more of Landtype 67 and may have inclusions of Landtypes 25, 29, 65, 66, 69, and 74.

Landtype 67 occurs on gentle to moderately sloping single slopes usually on benches or toeslopes of buttes. Aspects are generally northerly. Slope gradients range from 0 to 30 percent, but are commonly 10 to 20 percent. Elevation ranges from 4,500 to 5,800 feet, and the annual precipitation is estimated at 25 to 35 inches.

Vegetation is composed of mixed conifers including white fir, Douglas-fir, ponderosa pine, and minor amounts of lodgepole pine over snowbrush, manzanita, and sedges. Long-stollen sedge is often found on this landtype. Productivity is estimated at cubic foot Site Class 4 to 5 and Site Index 75 to 95 for ponderosa pine, and Site Index 40 to 50 for white fir.

This landtype has well to excessively drained soils derived from a moderately thick layer of volcanic ash and pumice over residuum and colluvium. On the northern part of the Forest, the surface material is mostly volcanic ash with very few pumice particles. Surface soils are typically loamy sands and pumiceous sands, and buried soils are sandy loams. Permeability is very rapid in the surface soil and rapid in the buried soils. Depth to bedrock is 24 to 60 inches.

Bedrock is composed of hard basalts, andesites, or rhyolites. Colors range from black to reddish brown. Fracturing ranges from highly fractured to moderate, yielding blocky to platy fragments. Materials are competent.

Landtype 67 is similar to Landtype 66 except for aspect and vegetation. Landtype 69 is similar but occurs on steeper slopes, and Landtype 65 is similar except for slope shape.

Range of Soil Characteristics of Landtype 67

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0.5 to 3 inches thick.
Surface Layers:	Dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure, 2 to 20 percent pumice coarse fragments; nonsticky, nonplastic; pH 6.0 to 6.5; 2 to 6 inches thick.
Sub-surface Layers:	Brown to brownish yellow loamy sand to pumiceous sand; massive to single grain; 2 to 30 percent pumice fragments and subangular blocky gravel and cobbles by volume; nonsticky, nonplastic; pH 6.0 to 7.0; 18 to 36 inches thick.
Buried Soil:	Dark brown to brown loamy fine sand to loam; massive; 20 to 60 percent subangular blocky to platy gravels, cobbles, and stones by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.2 to 7.0; 4 to 30 inches thick.

MAPPING UNIT 68

Mapping Unit 68 consists of 70 percent or more of Landtype 68 and may have inclusions of Landtypes 14, 66, 69, and 81.

Landtype 68 occurs on steeply sloping, smooth, single slopes on lava domes and lava ridges. Slope gradients are 30 to 60 percent and the aspect is generally southerly. Elevation ranges from 4,000 to 5,800 feet, and the annual precipitation is estimated at 20 to 35 inches per year.

Vegetation is composed dominantly of ponderosa pine, manzanita, bitterbrush, Idaho fescue, squirreltail, and sedges. At the upper elevation limits, bitterbrush and fescue may not be present. Productivity is estimated at cubic foot Site Class 5 and Site Index 65 to 85 for ponderosa pine.

This landtype bas excessively drained soils derived from a moderately thick layer of volcanic ash and pumice over residuum and colluvium. Surface soils are typically pumiceous loamy sands and sands, and buried soils are sandy loams. Permeability is very rapid in the surface soils and rapid in the buried soil. Depth to bedrock is 24 to 60 inches.

Bedrock consists of hard basalts, andesites, or rhyolites. Colors range from black to reddish brown. Degree of fracturing varies from highly fractured to moderately fractured yielding block to platy fragments. The materials are competent.

Landtype 68 is similar to Landtype 66 only it occurs on steeper slopes. Landtype 14 is similar to Landtype 68, but the slopes are usually shorter and much rougher. Landtype 69 is similar except it usually occurs on north aspects and has different vegetation.

Range of Soil Characteristics of Landtype 68

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0.5 to 2 inches thick.
Surface Layers:	Dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 2 to 20 percent pumice coarse fragments; nonsticky, nonplastic; pH 6.0 to 6.5; 2 to 6 inches thick.
Sub-surface Layers:	Strong brown to yellowish brown loamy sand to pumiceous sand; massive to single grain; 2 to 20 percent fragments and subangular block to platy gravels and cobbles by volume; nonsticky, nonplastic; pH 6.2 to 7.0; 15 to 36 inches thick.
Buried Soil:	Brown to reddish brown loamy fine sand to loam; massive; 20 to 60 percent blocky to platy gravels, cobbles, and stones by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.4 to 7.0; 6 to 30 inches thick.

MAPPING UNIT 69

Mapping Unit 69 consists of 70 percent or more of Landtype 69 and may have inclusions of Landtypes 14, 67, 68, and 82.

Landtype 69 occurs on steep, smooth to slightly dissected, single slopes on lava domes and ridges. Slope gradients are 30 to 60 percent. Elevation ranges from 4,500 to 5,800 feet, and the annual precipitation is estimated at 25 to 35 inches.

Vegetation is composed of mixed conifers consisting primarily of white fir, ponderosa pine, and Douglas-fir over snowbrush and sedges. Manzanita, chinquapin, and a variety of forbs may be included on some sites. Productivity is estimated at cubic foot Site Class 4 to 5 and Site Index 75 to 95 for ponderosa pine.

This landtype has well to excessively drained soils derived from a moderately thick layer of pumice and volcanic ash over residuum and colluvium. Surface soils are typically pumiceous loamy sands and sands, and buried soils are sandy loams. Permeability is very rapid in the surface soils and rapid in the buried soil. Depth to bedrock is 24 to 60 inches.

Bedrock may include basalts, andesites, or rhyolites. They are hard, moderately to highly fractured, and competent. Colors range from black to reddish brown. Fragments may be blocky or platy.

Landtype 69 is similar to Landtype 68 except for aspect and vegetation. It is similar to Landtype 67 but has steeper slopes. Landtype 9Z is similar to this landtype but it has thicker and coarser textured soils.

Range of Soil Characteristics of Landtype 69

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 3 inches thick.
Surface Layers:	Dark brown to yellowish brown pumiceous loamy sand to sand; weak, fine, crumb structure to massive or single grain; 2 to 20 percent pumice fragments and subangular blocky to platy gravels, cobbles, and stones; nonsticky, nonplastic; pH 6.0 to 7.0; 20 to 40 inches thick.
Buried Soil:	Brown to reddish brown loamy fine sand to loam; massive; 20 to 60 percent blocky to platy gravels, cobbles, stones, and boulders by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.4 to 7.0; 6 to 30 inches thick.

MAPPING UNIT 70

Mapping Unit 70 consists of 70 percent or more of Landtype 70 and may have inclusions of Landtypes 15, 63, 64, 76, and 7E.

Landtype 70 occurs on gently sloping lava plains. Slope gradients are generally less than 10 percent but may range up to 30 percent for short pitches. Elevation ranges from 4,500 to 6,000 feet, and the annual precipitation is about 18 to 25 inches.

Vegetation is composed dominantly of lodgepole pine, bitterbrush, and needlegrass. Productivity is estimated at cubic foot Site Class 5 and Site Index 40 to 50 for lodgepole pine.

This landtype has well to excessively drained soils formed from a moderately thick to thick layer of pumice and volcanic ash over thin residuum on basaltic lavas. Surface soils are typically pumiceous loamy sands, and buried soils are sandy loams. Permeability is very rapid in the surface soils and rapid to very rapid in the buried soil. Depth to bedrock is 30 to 65 inches.

Bedrock consists of black to dark gray, highly to moderately fractured basalts or andesites. Basalts are most prevalent. The bedrock is hard and competent.

Landtype 70 is similar to Landtypes 63 and 7E but differs in vegetation. It typically falls between Landtypes 63 and 7E in elevational sequence. Landtype 70 is similar to Landtype 6B but does not generally support ponderosa pine, and slopes are more gentle.

Range of Soil Characteristics of Landtype 70

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0.25 to 1 inch thick.
Surface Layers:	Dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 2 to 20 percent pumice coarse fragments; nonsticky, nonplastic; pH 6.0 to 6.5; 2 to 5 inches thick.
Sub-surface Layers:	Brown to brownish yellow pumiceous loamy sand to sand; weak, fine, crumb structure to single grain or massive; 5 to 40 percent pumice coarse fragments and blocky gravels and cobbles; nonsticky, nonplastic; pH 6.2 to 7.0; 18 to 45 inches thick.
Buried Soil:	Dark yellowish brown to brown loamy sand to sandy loam; 20 to 80 percent blocky cobbles and stones by volume; nonsticky, nonplastic; pH 6.2 to 6.8; 6 to 20 inches thick.

MAPPING UNIT 71

Mapping Unit 71 consists of 70 percent or more of Landtype 71 and may have inclusions of Landtypes 61, 62, and 78.

Landtype 71 occurs on moderately steep, long, smooth, single slopes on lava domes or ridges. Slope gradients are 20 to 30 percent. Elevation ranges from 3,800 to 4,600 feet, and the annual precipitation is about 14 to 18 inches.

Dominant vegetation consists of ponderosa pine, incense cedar, and some Douglas-fir over manzanita, bitterbrush, and Idaho fescue. Productivity is estimated at cubic foot Site Class 5 to 6 and Site Index 60 to 80 for ponderosa pine.

This landtype has well to excessively drained soils formed from a thin layer of volcanic ash over a thin to moderately thick residual soil on basalts and andesites. Surface soils are typically sandy loams and buried soils are loams. Permeability is very rapid in the surface soils and moderate to rapid in the buried soil. Depth to bedrock is 18 to 40 inches.

Bedrock is composed of gray to black or reddish brown, moderately to highly fractured andesites and basalts. Fragments are blocky to platy. The material is hard and competent.

Landtype 71 is similar to Landtype 61 only the slopes tend to be steeper and longer. Landtype 78 is similar but has steeper slopes than Landtype 71.

Range of Soil Characteristics of Landtype 71

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0.5 to 2 inches.
Surface Layers:	Dark grayish brown to reddish brown sandy loam; weak, fine, granular structure to massive; 5 to 20 percent subangular to subrounded gravel, cobbles, and stones by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.4 to 7.0; 10 to 24 inches thick.
Buried Soil:	Dark reddish brown to brown loam to sandy loam; massive to moderate medium, subangular blocky structure; 20 to 60 percent subrounded to platy gravels, cobbles, and stones by volume; slightly sticky to sticky, slightly plastic to plastic; pH 6.5 to 7.0; 10 to 24 inches thick.

MAPPING UNIT 72

Mapping Unit 72 consists of 70 percent or more of Landtype 72 and may have inclusions of Landtypes 14, 36, 6A, 64, and 75.

Landtype 72 occurs on gentle to moderately sloping, smooth to uneven lava plains. Slope gradients are 0 to 20 percent; mostly in the 5 to 15 percent range. Elevation ranges from 3,700 to 5,200 feet, and the annual precipitation is about 12 to 15 inches.

Dominant vegetation includes ponderosa pine, juniper, bitterhrush, rabbitbrush, sagebrush, Idaho fescue, cheatgrass, and needlegrass. Lodgepole pine may be included on some sites. Productivity is estimated at cubic foot Site Class 6 and Site Index 45 to 65 for ponderosa pine.

This landtype has well to excessively drained soils formed from a moderately thick layer of pumiceous volcanic ash over an older soil on basaltic lavas. Surface soils are typically loamy sands and buried soils are sandy loams or loams. Permeability is very rapid in the surface soils and rapid in the buried soil. Depth to bedrock is 24 to 50 inches.

Bedrock is composed of black to dark gray basalts or andesites. It is highly to moderately fractured and blocky. The material is hard and competent. Rock outcrops are common.

Landtype 72 is similar to Landtypes 6A and 64 but generally occurs on drier sites and at lower elevations. It is similar to Landtype 60, but it has coarser textured soils. Vegetation and surface soils of Landtype 36 are similar but underlying materials are different.

Range of Soil Characteristics of Landtype 72

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0 to 1.5 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb to granular structure; 2 to 20 percent pumice and gravel fragments by volume; nonsticky, nonplastic; pH 6.2 to 6.8; 3 to 8 inches thick.
Subsurface Layers:	Dark brown to yellowish brown pumiceous loamy sand to sand; massive to single grain; 2 to 20 percent pumice coarse fragments and blocky gravels and cobbles by volume; nonsticky, nonplastic; pH 6.4 to 7.0; 18 to 36 inches thick.
Buried Soil:	Brown to dark brown loamy fine sand to loam; massive; 20 to 70 percent blocky cobbles, stones, and gravels by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.5 to 7.0; 6 to 24 inches thick.

MAPPING UNIT 73

Mapping Unit 73 consists of 70 percent or more of Landtype 73 and may have inclusions of Landtypes 17, 19, 6H, and 15.

Landtype 73 occurs on smooth to slightly uneven lava plains. Slope gradients are typically less than 15 percent. Elevation ranges from 4,800 to 5,800 feet, and the annual precipitation is about 25 to 40 inches.

Vegetation includes lodgepole pine, currant, sedges, lupine, and needlegrass. White fir is sometimes present in the understory, and some mountain hemlock occurs at the upper elevation range of this landtype. Productivity is estimated at cubic foot Site Class 5 and Site Index 40 to 50 for lodgepole pine.

This landtype has well to excessively drained soils formed from a moderately thick layer of pumiceous volcanic ash over an older soil on basalts and andesites. Surface soils are typically loamy sands, and buried soils are cobbly sandy loams. Permeability is very rapid in the surface soils and rapid in the buried soil. Depth to bedrock is 24 to 50 inches.

Bedrock consists of black to gray, highly to moderately fractured, blocky basalts and andesites. It is hard and competent.

Landtype 73 is similar to Landtype 19 except it is underlain by bedrock instead of glacial till. It is similar to Landtype 7E except for ground vegetation. Landtype 6H is similar except it supports more white fir than Landtype 73 and generally is more sloping.

Range of Soil Characteristics of Landtype 73

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0.25 to 2.0 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 2 to 20 percent pumice coarse fragments; nonsticky, nonplastic; pH 6.0 to 6.5; 2 to 6 inches thick.
Subsurface Layers:	Brown to yellowish brown pumiceous loamy sand to sand; massive to single grain; 2 to 30 percent pumice coarse fragments and blocky gravels and cobbles by volume; nonsticky, nonplastic; pH 6.0 to 7.0; 18 to 30 inches thick.
Buried Soil:	Dark brown to brown loamy fine sand to loam; massive; 20 to 70 percent blocky cobbles, stones, and gravels by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.2 to 6.8; 6 to 24 inches thick.

MAPPING UNIT 74

Mapping Unit 74 consists of 70 percent or more of Landtype 74 and may have inclusions of Landtypes 1, 11, 14, 65, 76, and 77.

Landtype 74 occurs on rough, uneven lavaflow lands. Overall slope gradients are about 7 to 10 percent, but local steep pitches are present. Elevation ranges from 4,700 to 6,000 feet, and the annual precipitation is about 25 to 35 inches.

Vegetation consists of mixed conifers including white fir, Douglas-fir, ponderosa pine, and lodgepole pine over snowbrush, manzanita, sedges, and a few forbs. Productivity is estimated at cubic foot Site Class 5 to 6 and Site Index 50 to 80 for ponderosa pine.

This landtype has well to excessively drained, very cobbly soils formed from a pumice and volcanic ash layer over rough, broken lavas. No significant amount of soil had formed over the lavas prior to the Mazama pumice and ash fall, so it filtered readily into the lavas. The soils are very cobbly to stony, loamy sands and sands. Permeability is very rapid. Depth of soil is 20 to 45 inches.

Bedrock is generally composed of dark gray to black, highly fractured, blocky basalts. It is hard and competent.

Landtype 74 is similar to Landtype 75, 76, and 77 except for vegetation. Landtype 65 is somewhat similar but the soils are not as stony as in Landtype 74.

Range of Soil Characteristics of Landtype 74

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0 to 2 inches.
Surface Layers:	Dark brown to yellowish brown, very cobbly pumiceous loamy sand to sand; single grain to weak, fine, crumb structure; 30 to 80 percent blocky cobbles, stones, and gravels by volume; nonsticky, nonplastic; pH 6.2 to 7.0; 20 to 40 inches thick.
Subsoil Layers:	Dark gray to reddish brown, very cobbly loamy sand to sand; single grain; 60 to 90 percent blocky cobbles, stones, and gravels by volume; nonsticky, nonplastic; pH 6.2 to 7.0; 0 to 10 inches thick.

MAPPING UNIT 75

Mapping Unit 75 consists of 70 percent or more of Landtype 75 and may have inclusions of Landtypes 1, 11, 14, 64, 72, and 76.

Landtype 75 occurs on uneven lavaflow lands. The general slope gradient is 5 to 15 percent, but the landform is highly broken with many short, steep pitches. Elevation ranges from 4,300 to 4,600 feet, and the annual precipitation is about 12 to 15 inches.

Primary vegetation is composed of species such as ponderosa pine, juniper, rabbitbrush, sagebrush, bitterbrush, Idaho fescue, and cheatgrass. This landtype is considered noncommercial to marginal. Productivity is estimated at cubic foot Site Class 6 and Site Index 40 to 60 for ponderosa pine.

This landtype has shallow to moderately deep, excessively drained, very cobbly and stony soils derived from pumice and volcanic ash on broken basaltic lavas. The soils are very cobbly pumiceous loamy sands and sands. Permeability is very rapid. Depth of soil is 10 to 40 inches.

Bedrock is composed of black to dark gray, highly fractured, blocky basaltic lavas. It is hard and competent.

Landtype 75 is similar to Landtypes 7A, 74, 76, and 77 except for vegetation. It is similar to Landtype 11 but more soil is present. Landtype 72 is somewhat similar but is not as stony.

Range of Soil Characteristics of Landtype 75

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0 to 1.5 inches thick.
Surface Layers:	Dark brown to yellowish brown, very cobbly, pumiceous loamy sand to sand; single grain to weak, fine, granular structure; 2 to 10 percent pumice fragments and 40 to 80 percent blocky cobbles, stones, and gravel by volume; nonsticky, nonplastic; pH 6.4 to 7.2; 10 to 40 inches thick.
Subsoil Layers:	Soils below the surface pumice and ash soils are generally not present.

MAPPING UNIT 76

Mapping Unit 76 consists of 70 percent or more of Landtype 76 and may have inclusions of Landtypes 1, 11, 14, and 64.

Landtype 76 occurs on uneven lavaflow lands. The general slope gradient is 5 to 15 percent but the landform may be highly broken with many short, steep pitches. Elevation ranges from 4,300 to 5,900 feet, and the annual precipitation is about 15 to 25 inches.

Primary vegetation includes ponderosa pine, lodgepole pine, bitterbrush, manzanita, Idaho fescue, and sedges. Productivity is estimated at cubic foot Site Class 5 to 6 and Site Index 50 to 80 for ponderosa pine, and cubic foot Site Class 5 to 6 and Site Index 30 to 40 for lodgepole pine.

This landtype has shallow to moderately deep, excessively drained, very cobbly and stony soils formed from pumice and volcanic ash over highly fractured basaltic lavas. The soils are typically very cobbly loamy sands and sands. Permeability is very rapid. Depth of soil is 10 to 40 inches.

Bedrock is composed of black to dark gray, highly fractured, blocky basalts. It is hard and competent.

Landtype 76 is similar to Landtype 74, 75, 7A, and 77 with the exception of vegetation. Landtype 64 is similar but has deeper soils that are not as stony.

Range of Soil Characteristics of Landtype 76

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 2 inches thick.
Surface Layers:	Dark brown to yellowish brown, very cobbly, pumiceous loamy sands and sands; single grain to weak, fine, crumb structure; 2 to 15 percent pumice coarse fragments and 40 to 80 percent blocky cobbles, stones, and gravel by volume; nonsticky, nonplastic; pH 6.2 to 7.0; 10 to 40 inches thick.
Subsoil Layers:	Soils below the surface pumice and ash soils are generally not present.

MAPPING UNIT 77

Mapping Unit 77 consists of 70 percent or more of Landtype 77 and may have inclusions of Landtypes 1, 11, 74, 76, 70, and 7A.

Landtype 77 occurs on uneven to relatively smooth lavaflow lands or lava plains. General slope gradients are typically less than 10 percent, but steep, short pitches are present. Elevation ranges from 5,500 to 6,500 feet, and the annual precipitation ranges from about 20 to 30 inches.

Vegetation is composed of lodgepole pine, bitterbrush, snowbrush, currant, sedges, needlegrass, and lupine. Minor amounts of white fir may be present on some sites. Productivity is estimated at cubic foot Site Class 5 to 6 and Site Index 30 to 40 for lodgepole pine.

This landtype has shallow to moderately deep, excessively drained soils formed from volcanic ash and pumice over highly fractured basaltic lavas. The soils are stony to very cobbly pumiceous loamy sands and sands. Permeability is very rapid. Depth of soil is 10 to 40 inches.

Bedrock is composed of black to dark gray, highly fractured, blocky basalts. It is hard and competent.

Landtype 77 is similar to Landtype 74, 75, and 7A with the exception of vegetation. It lies between Landtypes 75 and 7A in elevational sequence. Landtype 74 supports mixed conifers, while Landtype 77 supports nearly pure lodgepole pine.

Range of Soil Characteristics of Landtype 77

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0.5 to 1.5 inches thick.
Surface Layers:	Very dark grayish brown to light yellowish brown, very cobbly to stony pumiceous loamy sands and sands; weak, fine, crumb structure to single grain; 2 to 15 percent pumice coarse fragments and 40 to 80 percent blocky cobbles, stones, and gravel by volume; nonsticky, nonplastic; pH 6.0 to 7.0; 10 to 40 inches thick.
Subsoil Layers:	Soils below the surface pumice and ash layer are generally not present.

MAPPING UNIT 78

Mapping Unit 78 consists of 70 percent or more of Landtype 78 and may have inclusions of Landtypes 51, 60, 61, and 79.

Landtype 78 occurs on steep, smooth to slightly dissected side slopes of ridges. Slope gradients are 30 to 60 percent and generally have a south aspect. Elevation ranges from 3,200 to 3,600 feet on the Sisters District and 4,800 to 5,400 feet on the Fort Rock District. Annual precipitation ranges from about 18 to 35 inches.

Vegetation is composed dominantly of ponderosa pine, manzanita, bitterbrush, and sedges. Some snowbrush and white fir is present at the upper elevation limits, and Idaho fescue is present at the lower elevation range. Productivity is estimated at cubic foot Site Class 5 to 6 and Site Index 60 to 80 for ponderosa pine.

This landtype has well to excessively drained soils derived from a thin to moderately thick layer of volcanic ash over residuum and colluvium on andesites and basalts. Surface soils are typically sandy loams and subsoils are loams. Permeability is rapid to very rapid in the surface soil and moderate to rapid in the subsoil. Depth to bedrock is 20 to 50 inches.

Bedrock is composed of black to pinkish colored andesites, basalts, and rhyolites. It is moderately to highly fractured; and is often platy, but may be blocky. It is hard and competent.

Landtype 78 is similar to Landtype 68 except it has finer textured soils. Landtype 79 is similar but generally occurs on north aspects and has different vegetation. Landtype 7K is similar but occurs in a lower precipitation zone and has different vegetation.

Range of Soil Characteristics of Landtype 78

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 2 inches thick.
Surface Layers:	Very dark brown to dark brown sandy loam to loamy fine sand; weak, fine, granular structure to massive; 5 to 20 percent platy and blocky gravel, cobbles, and stones by volume; nonsticky, nonplastic; pH 6.2 to 7.0; 8 to 24 inches thick.
Buried Soil:	Reddish brown to dark brown loam to sandy loam; massive to weak, medium, blocky structure; 20 to 60 percent platy and blocky cobbles and stones by volume; sticky to slightly sticky, plastic to slightly plastic; pH 6.5 to 7.0; 10 to 30 inches thick.

MAPPING UNIT 79

Mapping Unit 79 consists of 70 percent or more of Landtype 79 and may have inclusions of Landtypes 52, 62, and 78.

Landtype 79 occurs on steep side slopes of ridges, generally with a north aspect. Slopes are smooth to slightly dissected and have a gradient of 30 to 60 percent. Elevation ranges from 3,700 to 4,600 feet, and the annual precipitation is about 20 to 30 inches.

Vegetation is composed of mixed conifers including white fir, Douglas-fir, larch, and ponderosa pine over snowbrush, chinquapin, snowberry, vine maple, princess pine, and a variety of forbs. Productivity is estimated at cubic foot Site Class 4 to 5 and Site Index 80 to 100 for ponderosa pine and 90 to 110 for Douglas-fir.

This landtype has well drained soils derived from a thin to moderately thick layer of volcanic ash over residuum and colluvium. Surface soils are typically sandy loams and subsoils are loams. Permeability is rapid to very rapid in the surface soils and moderate to rapid in the subsoil. Depth to bedrock is 24 to 50 inches.

Bedrock consists of black to pinkish colored, platy to blocky; andesites, basalts, and rhyolites. It is hard and competent. Some breccias and tuffs occur as inclusions.

Landtype 79 is similar to Landtype 78 but occurs on different aspects and has different vegetation. Landtype 62 is similar except the slopes are not as steep. Landtype 69 is similar except the soils are coarser textured than in Landtype 79.

Range of Soil Characteristics of Landtype 79

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1.5 to 3 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure to massive; 5 to 20 percent blocky and platy gravels and cobbles by volume; nonsticky, nonplastic; pH 6.2 to 6.8; 10 to 30 inches thick.
Buried Soil:	Reddish brown to dark brown loam to sandy loam; massive, to weak, medium, blocky structure; 20 to 60 percent blocky and platy cobbles, stones, and gravel by volume; slightly sticky to sticky, slightly plastic to plastic; pH 6.2 to 7.0; 12 to 30 inches thick.

MAPPING UNIT 80

Mapping Unit 80 consists of 70 percent or more of Landtype 80 and may have inclusions of Landtypes 9 and 81.

Landtype 80 occurs on cinder cones in a low precipitation zone. Slope gradients are about 25 to 70 percent, and aspects are often southerly. Elevation ranges from 4,000 to 5,200 feet, and the annual precipitation is about 10 to 15 inches.

Vegetation includes ponderosa pine, juniper, sagebrush, rabbitbrush, bitterbrush, mountain mahogany, Idaho fescue, cheatgrass, and bluebunch wheatgrass. Tree species are sparse and the landtype is considered non-commercial for timber production.

This landtype has excessively drained soils formed from a thin to moderately thick layer of volcanic ash over a thin older soil on cinders. Surface soils are typically sandy loams or loamy sands and subsoils are cindery loamy sands and cinders. Permeability is very rapid in both the surface soils and subsoils. Depth to cinders is 10 to 40 inches.

Landtype 80 is similar to Landtype 81 but occurs on drier sites and has different vegetation. It is similar to Landtype 9 but generally has volcanic ash soils while Landtype 9 lacks a volcanic ash layer and typically has sparser vegetation.

Range of Soil Characteristics of Landtype 80

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 0.5 inch.
Surface Layers:	Very dark gray to brown sandy loam to loamy sand; weak, fine, granular structure to massive; 10 to 30 percent gravel sized cinders and basalt fragments; nonsticky, nonplastic; pH 6.8 to 7.2; 10 to 30 inches thick.
Subsoil Layers:	Brown to reddish brown very cindery loamy sand to very cindery sand; single grain; 50 to 80 percent cinder coarse fragments; nonsticky, nonplastic; pH 6.8 to 7.2; 0 to 20 inches thick over reddish or grayish colored cinders.

MAPPING UNIT 81

Mapping Unit 81 consists of 70 percent or more of Landtype 81 and may have inclusions of Landtypes 9, 80, 82, 66, and 68.

Landtype 81 occurs on cinder cones. Slopes are smooth, convex, and have a gradient of 25 to 70 percent. Aspects are generally southerly. Elevation ranges from 3,200 to 6,200 feet. The annual precipitation ranges from about 18 to 35 inches.

Vegetation is composed dominantly of ponderosa pine, bitterbrush, manzanita, and Idaho fescue. At the upper elevation limits, the ground cover is primarily manzanita, snowbrush, and sedges. Productivity is estimated at cubic foot Site Class 5 to 6 and Site Index 60 to 80 for ponderosa pine.

This landtype has excessively drained soils derived from a moderately thick to thick layer of pumice and volcanic ash over a thin older soil on cinders. Surface soils are typically pumiceous loamy sands and buried soils are cindery sandy loams. Permeability is very rapid. Depth to cinders is 18 to 50 inches.

Landtype 81 is similar to Landtype 80 but occurs at higher elevations and has different vegetation. Landtype 82 is similar but the aspect is generally northerly and the vegetation is different. Landtype 81 is similar to Landtype 68 except the underlying materials are different.

Range of Soil Characteristics of Landtype 81

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 2 inches thick.
Surface Layers:	Dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 2 to 20 percent pumice coarse fragments; nonsticky, nonplastic; pH 6.0 to 6.5; 2 to 10 inches thick.
Sub-surface Layers:	Brown to brownish yellow pumiceous loamy sand to sand; single grain to massive; 5 to 30 percent pumice, cinder, and basalt fragments by volume; nonsticky, nonplastic; pH 6.2 to 7.0; 15 to 36 inches thick.
Buried Soil:	Brown to reddish brown cindery loamy sand to sandy loam; single grain to massive; 30 to 80 percent cinders by volume; nonsticky, nonplastic; pH 6.5 to 7.0; 0 to 20 inches thick over cinders.

MAPPING UNIT 82

Mapping Unit 82 consists of 70 percent or more of Landtype 82 and may have inclusions of Landtypes 9, 67, 69, 81, and 83.

Landtype 82 occurs on cinder cones. The aspect is typically northerly and slopes are single, convex, and smooth. Slope gradients range from 25 to 70 percent. Elevation ranges from 3,500 to 6,200 feet, and the annual precipitation is about 20 to 40 inches.

Vegetation is composed dominantly of mixed conifers including ponderosa pine, white fir, lodgepole pine, and Douglas-fir over snowbrush, sedges, and forbs. Chinquapin and manzanita may also be present. Productivity is estimated at cubic foot Site Class 4 to 5 and Site Index 70 to 95 for ponderosa pine.

This landtype has excessively well drained soils derived from a moderately thick layer of pumice and volcanic ash over an older soil on cinders. Surface soils are typically pumiceous loamy sands and buried soils are cindery loamy sands. Permeability is very rapid. Depth to cinders is 18 to 50 inches.

Landtype 82 is similar to Landtypes 80, 81, and 83 but differs in vegetation and the general climatic situation. Landtype 69 is similar but occurs over hard rock instead of cinders.

Range of Soil Characteristics of Landtype 82

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 3 inches thick.
Surface Layers:	Dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 2 to 20 percent pumice fragments; nonsticky, nonplastic; pH 6.0 to 6.5; 2 to 6 inches thick.
Sub-surface Layers:	Brown to brownish yellow pumiceous loamy sand to sand; massive to single grain; 5 to 30 percent pumice coarse fragments and subangular to irregular gravels by volume; nonsticky, nonplastic; pH 6.2 to 7.0; 15 to 36 inches thick.
Buried Soil:	Brown to reddish brown cindery sandy loam to loamy sand; massive to single grain; 30 to 80 percent gravel and cobble sized cinders; nonsticky, nonplastic; pH 6.5 to 7.0; 0 to 20 inches thick over reddish or grayish colored cinders.

MAPPING UNIT 83

Mapping Unit 83 consists of 70 percent or more of Landtype 83 and may have inclusions of Landtypes 9, 82, and 84.

Landtype 83 occurs at high elevations on cinder cones. Slopes are single, smooth, and convex with a gradient of 25 to 70 percent. Elevation ranges from 5,700 to 6,800 feet, and the annual precipitation is about 40 to 70 inches.

Vegetation is composed dominantly of mountain hemlock with some true firs, lodgepole pine, and western white pine. Common ground cover plants are huckleberry, sedges, and woodrush. Snowbrush may be present at the lower elevation range. This is considered a low to unproductive landtype for timber production.

This landtype has well to excessively drained soils formed from a moderately thick layer of pumice and volcanic ash over cinders or an older soil on cinders. Surface soils are typically pumiceous loamy sands, and buried soils are cindery loamy sands. Permeability is very rapid, although infiltration may be limited somewhat by nonwettable materials. Depth to cinders is 18 to 40 inches.

Landtype 83 is similar to Landtype 82 but occurs at higher elevations and has different vegetation. It is similar to Landtype 84 except for underlying materials. Landtype 9 is similar but lacks a surface soil layer and has sparser vegetation.

Range of Soil Characteristics of Landtype 83

Litter:	Needles, leaves, twigs, and decomposing organic matter often forming a tight mat; 1 to 2.5 inches thick.
Surface Layers:	Dark brown to gray sandy loam to loamy sand; weak, fine, crumb structure to massive; 5 to 30 percent pumice and cinder fragments; nonsticky, nonplastic; pH 5.5 to 6.2; 2 to 5 inches thick.
Sub-surface Layers:	Yellowish brown to strong brown sandy loam to pumiceous sand, mostly loamy sand; massive to single grain; 5 to 20 percent pumice and cinder coarse fragments by volume; nonsticky, nonplastic; pH 5.8 to 6.8; 12 to 35 inches thick.
Buried Soil:	Brown to reddish brown cindery sandy loam to loamy sand; single grain to massive; 20 to 80 percent gravel and cobble sized cinders; nonsticky, nonplastic; pH 6.5 to 7.0; 0 to 20 inches thick over reddish or grayish colored cinders.

MAPPING UNIT 84

Mapping Unit 84 consists of 70 percent or more of Landtype 84 and may have inclusions of Landtypes 1, 3, 12, 13, 83, and 85.

Landtype 84 occurs on smooth to moderately dissected, steep, side slopes of shield or composite volcanoes. Slope gradients are 30 to 80 percent. Elevation ranges from 6,000 to 7,000 feet, and the annual precipitation is about 40 to 80 inches.

Vegetation is composed dominantly of mountain hemlock, true firs, and lodgepole pine over woodrush, huckleberry, and sedges. The landtype is low to unproductive for timber production.

This landtype has well to excessively drained soils formed from a thin to thick layer of volcanic ash and pumice over stratified volcanic materials. A buried soil may or may not be present. Surface soils are typically pumiceous loamy sands and buried soils are sands to sandy loams. Permeability is very rapid. Surface nonwettable materials are often present. Depth to bedrock is 20 to 70 inches.

Bedrock is composed of complex volcanic rocks including basalts and andesites, tuffs, breccias, and scoria. Beds of cinders and volcanic ash are also present. Materials range from competent to incompetent.

Landtype 84 is similar to Landtype 83 except the underlying materials are more complex. It is similar to Landtype 85 but occurs on steeper slopes.

Range of Soil Characteristics of Landtype 84

Litter:	Needles, twigs, cones, and decomposing organic matter often forming a tight mat; 1 to 3 inches thick.
Surface Layers:	Dark grayish brown to gray sand loam to loamy sand; weak, fine crumb structure to massive; 5 to 20 percent pumice coarse fragments; nonsticky, nonplastic; pH 5.5 to 6.2; 2 to 5 inches thick.
Sub-surface Layers:	Gray to dark brown sandy loam to pumiceous loamy sand; single grain to massive; 5 to 30 percent pumice and blocky gravels, cobbles, and stones by volume; nonsticky, nonplastic; pH 5.8 to 6.8; 15 to 36 inches thick.
Buried Soil:	Very dark grayish brown to yellowish brown loamy sand to sand; single grain; 20 to 50 percent blocky and irregular gravels, cobbles, and stones by volume; nonsticky, nonplastic; pH 6.4 to 7.0; 0 to 40 inches thick.

MAPPING UNIT 85

Mapping Unit 85 consists of 70 percent or more of Landtype 85 and may have inclusions of Landtypes 1, 16, 6H, 7F, and 84.

Landtype 85 occurs on broad volcanic ridgetops, benches, and toeslopes of shield and composite volcanoes. Slopes are smooth to uneven, with gradients of 0 to 30 percent. Elevation ranges from 6,000 to 6,800 feet, and the annual precipitation is about 40 to 80 inches.

Vegetation is composed dominantly of mountain hemlock, true firs, and lodgepole pine over huckleberry, woodrush, and sedges. It is considered a noncommercial to marginal landtype for timber production.

This landtype has well to excessively drained soils formed from a moderately thick layer of pumice and volcanic ash over an older soil on complex volcanic materials. Surface soils are typically pumiceous loamy sands and buried soils are sandy loams. Permeability is very rapid in the surface soils and rapid to very rapid in the buried soil. A nonwettable zone is often present at the surface. Depth to bedrock is 20 to 70 inches.

Bedrock is composed dominantly of hard basalts and andesites, and has inclusions of tuffs, breccias, and cinders. Materials range from competent to incompetent. They are highly fractured to massive.

Landtype 85 is similar to Landtype 84 but occurs on more gentle slopes. It is similar to Landtype 16 except for underlying materials and Landtype 16 generally has smoother slopes.

Range of Soil Characteristics of Landtype 85

Litter:	Needles, twigs, cones, and decomposing organic matter often forming a tight mat; 1 to 3 inches thick.
Surface Layers:	Dark grayish brown to gray sandy loam to loamy sand; weak, fine, crumb structure to massive; 5 to 20 percent pumice coarse fragments; nonsticky, nonplastic; pH 5.5 to 6.2; 2 to 5 inches thick.
Sub-surface Layers:	Brownish yellow to strong brown pumiceous loamy sand to sand; massive to single grain; 5 to 30 percent pumice coarse fragments and blocky gravels, cobbles, and stones by volume; nonsticky, nonplastic; pH 5.8 to 6.8; 18 to 36 inches thick.
Buried Soil:	Brown to yellowish brown sandy loam to loamy sand; massive; 20 to 60 percent blocky gravels, cobbles, and stones by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.4 to 7.0; 0 to 40 inches thick.

MAPPING UNIT 86

Mapping Unit 86 consists of 70 percent or more of Landtype 86 and may have inclusions of Landtypes 67, 79, and 90.

Landtype 86 occurs on steep, moderately dissected slopes on protected aspects of composite volcanoes. Slope gradients are 30 to 60 percent. Elevation ranges from 4,500 to 6,400 feet, and the annual precipitation is about 25 to 40 inches.

Vegetation is composed of mixed conifers including ponderosa pine, white fir, Douglas-fir, and larch over snowbrush and a variety of grasses, sedges, and forbs. Bracken fern may also be present. Productivity is estimated at cubic foot Site Class 4 to 5 and Site Index 80 to 100 for ponderosa pine.

This landtype has well drained soils derived from a moderately thick layer of volcanic ash over residuum and colluvium on stratified volcanics. Surface soils are typically sandy loams and loamy sands, and buried soils are sandy loams or loams. Permeability is very rapid in the surface soil and rapid to moderate in the buried soil. Depth to bedrock is 28 to 60 inches.

Bedrock materials consist of complex volcanics including andesitic and basaltic lavas, scoria, breccias, tuffs, cinders, and ash. It ranges from hard to sfrom hard to soft, and competent to incompetent.

Landtype 86 is similar to Landtype 87 but occurs on more protected aspects. Landtype 79 is similar but the underlying materials are not as complex and there is less dissection of the slopes. Landtype 86 is somewhat similar to Landtype 88 except for degree of dissection and landform.

Range of Soil Characteristics of Landtype 86

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 3 inches thick.
Surface Layers:	Black to dark grayish brown sandy loam to loamy sand; weak, fine, crumb structure to massive; 5 to 20 percent blocky gravels, cobbles, and stones by volume; nonsticky, nonplastic; pH 6.2 to 6.8; 18 to 36 inches thick.
Buried Soil:	Dark grayish brown to reddish brown sandy loam to loam; massive; 30 to 60 percent blocky gravels, cobbles, stones, and boulders; nonsticky to sticky, nonplastic to plastic; pH 6.2 to 7.0; 10 to 30 inches thick.

MAPPING UNIT 87

Mapping Unit 87 consists of 70 percent or more of Landtype 87 and may have inclusions of Landtypes 61, 68, and 79.

Landtype 87 occurs on steep, moderately dissected, exposed slopes on composite volcanoes. Slope gradients are 30 to 60 percent. Elevation ranges from 4,500 to 6,400 feet and the annual precipitation is estimated at 25 to 35 inches.

Vegetation is composed dominantly of ponderosa pine, manzanita, bitterbrush, and sedges. Productivity is estimated at cubic foot Site Class 5 and Site Index 65 to 85 for ponderosa pine.

This landtype has excessively drained soils derived from a thin to moderately thick layer of volcanic ash over residuum and colluvium. Surface soils are typically sandy loams and loamy sands, and buried soils are cobbly sandy loams to loams. Permeability is very rapid in the surface soil and very rapid to rapid in the buried soil. Depth to bedrock is 24 to 50 inches.

Bedrock consists of stratified volcanic materials including hard basalts and andesites, and hard to soft breccias and tuffs. Cinders and volcanic ash are also components of the substrata. It ranges from competent to incompetent.

Landtype 87 is similar to Landtype 86 except for aspect and vegetation. It is similar to Landtype 68 except the soils are not quite as coarse in texture, the slopes are more dissected, and underlying materials are more varied.

Range of Soil Characteristics of Landtype 87

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 2.5 inches thick.
Surface Layers:	Very dark grayish brown to dark yellowish brown sandy loam to loamy sand; weak, fine, granular structure to massive; 5 to 25 percent blocky gravels, cobbles, and stones by volume; nonsticky, nonplastic; pH 6.2 to 6.8; 12 to 30 inches thick.
Buried Soil:	Dark brown to reddish brown very cobbly sandy loam to loam; massive; 30 to 70 percent block and irregular cobbles, stones, and gravel by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.5 to 7.0; 10 to 30 inches thick.

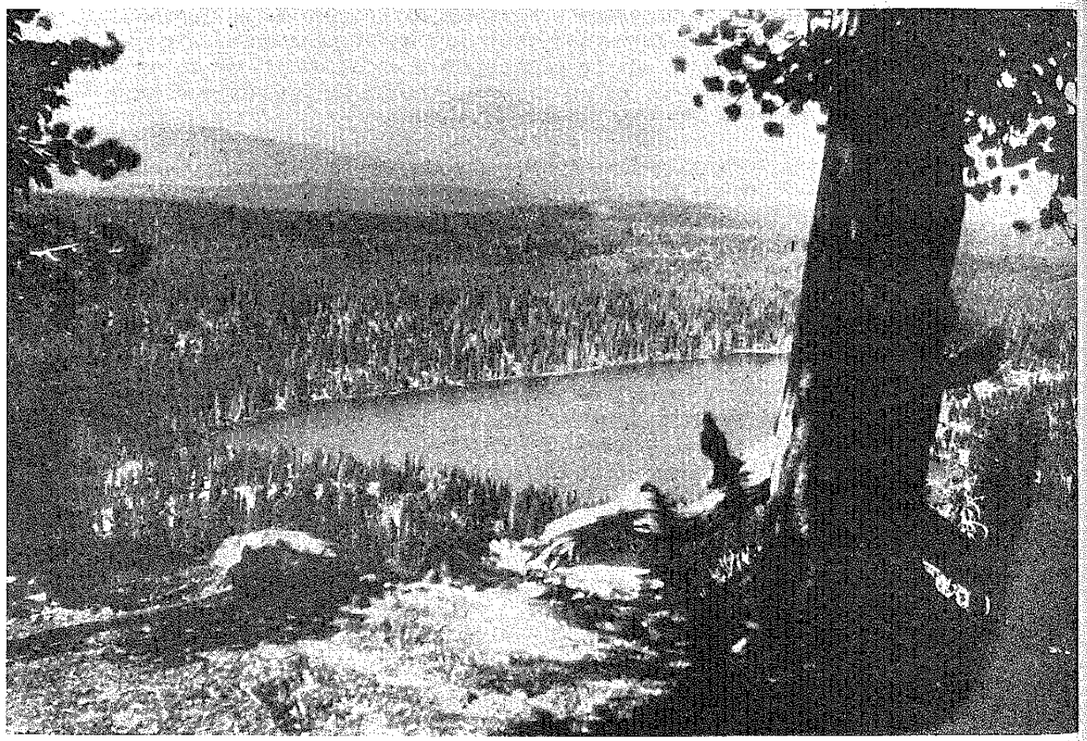
MAPPING UNIT 88 - Highly Dissected Fault Escarpments

Mapping Unit 88 consists of 70 percent or more of Landtype 88 and may have inclusions of Landtypes 51, 52, 62, 79, 89, and 90.

Landtype 88 is a miscellaneous landtype occurring on very steeply sloping, highly dissected fault escarpments. Slope gradients range from 30 to 80 percent, and elevation ranges from 3,500 to 4,600 feet. Soils are shallow to deep loamy sands to loams. They are very stony in some spots. Underlying marerials are stratified pyroclastics, andesites, and basalts. Rock outcrops are common along the upper third of the ridge. Some diatomacious earth has been observed in roadcuts within this landtype.

Vegetation is composed dominantly of mixed conifers including ponderosa pine, Douglas-fir, white fir, and incense cedar. Productivity is estimated at cubic foot Site Class 4 to 5 and Site Index 65 to 90 for ponderosa pine. The steep slopes limit timber management activities.

Landtype 88 is similar to Landtype 86 except the slopes are steeper and more dissected, and the landform is different. Landtype 89 is similar but soils are shallower and more stony, and vegetation is sparser.



MAPPING UNIT 89 - Highly dissected, Rocky, Fault Escarpments

Mapping Unit 89 consists of 70 percent or more of Landtype 89 and may have inclusions of Landtypes 50, 51, 52, 79, 88, and 90.

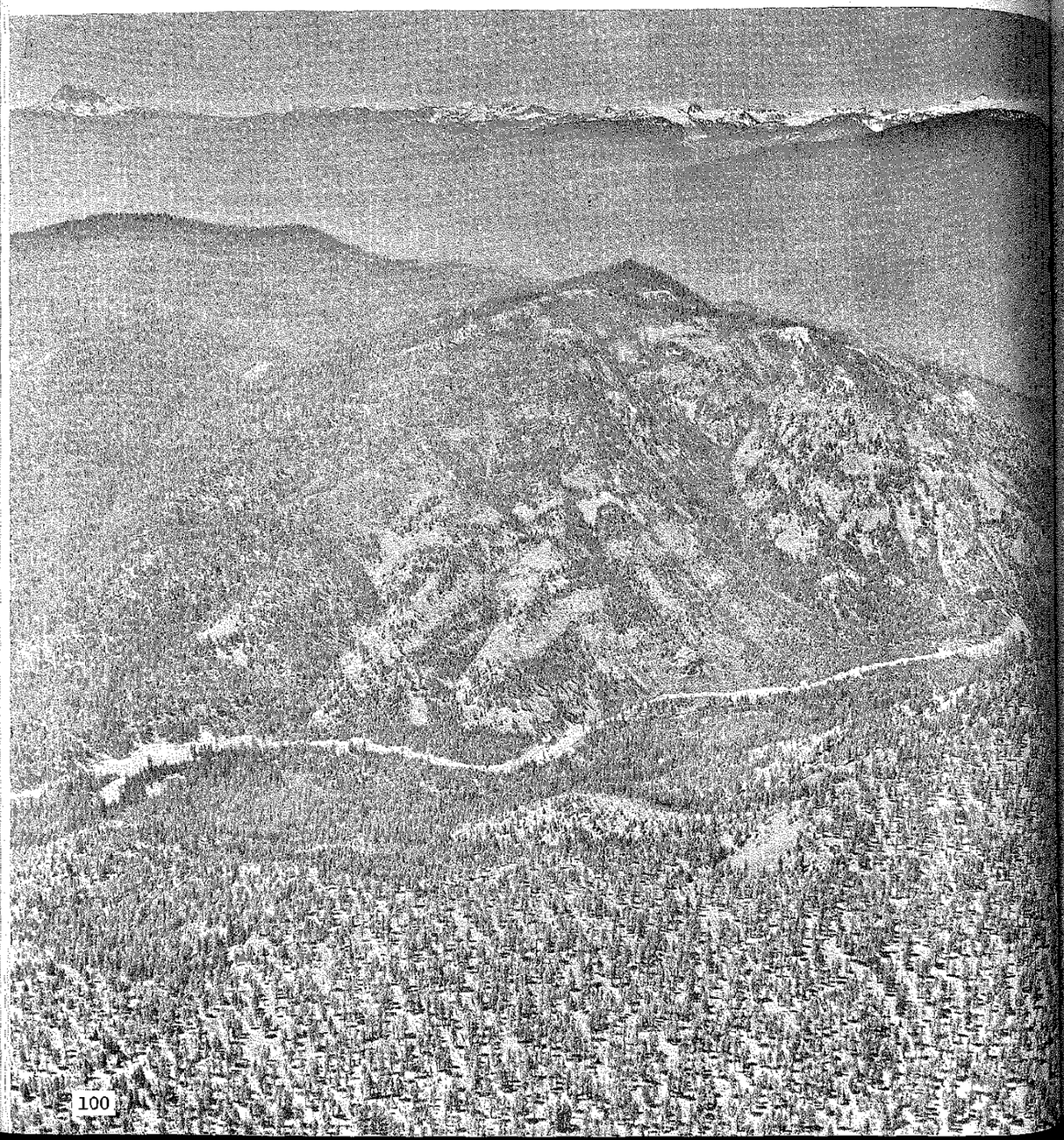
Landtype 89 is a miscellaneous landtype that occurs on very steeply sloping, highly dissected, fault escarpments. Slope gradients are 30 to 80 percent, and the elevation ranges from 3,300 to 4,700 feet. Bedrock consists of stratified volcanics and waterlain deposits including platy andesites, basalts, breccias, tuffs, ash flows, diatomacious earth, and conglomerates. Soils range from shallow and very stony to medium-textured deep soils.

Vegetation is sparse over much of this landtype. On protected sites, the vegetation is quite varied and includes Douglas-fir, larch, ponderosa pine, incense cedar, and white fir. This is considered a noncommercial to marginal landtype for timber production.

Landtype 89 is similar to Landtype 88 but the soils tend to be shallower and the vegetation is sparser.



Figure 7. At the north end of the Deschutes National Forest is an area of steeply sloping, dissected lands above the Metolius River. This photo shows a view looking southwesterly from a point north of the Metolius Breaks. It is the northern portion of the Green Ridge system. The geology and soils are complex. Both volcanic materials and water-lain sediments are present, with tuffs and breccias being common. Mapping Unit 89 is representative of these steep, complex lands.



MAPPING UNIT 90

Mapping Unit 90 consists of 70 percent or more of Landtype 90 and may have inclusions of Landtypes 26, 62, and 88.

Landtype 90 occurs on toeslopes and benches of fault escarpments. Slope gradients are 0 to 30 percent. Elevation ranges from 3,200 to 3,600 feet, and the annual precipitation is about 25 to 35 inches.

Vegetation is composed of mixed conifers including Douglas-fir, white fir, ponderosa pine, larch, and incense cedar over snowbrush, manzanita, sedges, pinegrass, and a variety of forbs. Productivity is estimated at cubic foot Site Class 4 to 5 and Site Index 80 to 100 for ponderosa pine and 90 to 120 for Douglas-fir.

This landtype has well drained, moderately deep to deep soils formed from volcanic ash, residuum, and colluvium. Surface soils are typically sandy loams, and subsoils are sandy loams or loams. Permeability is rapid in the surface soil and rapid to moderate in the subsoil. Depth to bedrock is 30 to 60 inches.

Bedrock consists of stratified volcanics and waterlain deposits including hard andesites and basalts, tuffs, breccias, and diatomacious earth. It ranges from competent to incompetent.

Landtype 90 is similar to Landtype 26 but the soil tends to be finer, vegetation is different, and underlying materials are more complex. It is similar to Landtype 62 except for landform, and the subsoils are usually not as fine in texture.

Range of Soil Characteristics of Landtype 90

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 2 inches thick.
Surface Layers:	Dark grayish brown to dark brown sandy loam to loamy fine sand; weak, fine, granular structure to massive; 2 to 20 percent block and platy gravels and cobbles; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.0 to 7.0; 10 to 24 inches thick.
Buried Soil:	Dark brown to dark yellowish brown loam to sandy loam; moderate, medium subangular blocky to massive; 5 to 60 percent cobbles, stones, and gravel by volume; nonsticky to sticky, nonplastic to plastic; pH 6.5 to 7.0; 20 to 40 inches thick.

MAPPING UNIT 91

Mapping Unit 91 consists of 70 percent or more of Landtype 91 and may have inclusions of Landtypes 4C, 6C, 53, and 7K.

Landtype 91 occurs on smooth to moderately dissected, steep slopes of mountains in a low precipitation zone. Slope gradients range from about 25 to 60 percent. Elevation ranges from 4,900 to 6,400 feet, and the annual precipitation is estimated at 10 to 20 inches.

Vegetation is composed of sagebrush, rabbitbrush, Idaho fescue, wheatgrasses, cheatgrass, and a few scattered juniper and ponderosa pine. This landtype has very low potential for timber production.

This landtype has excessively to well drained, shallow to moderately deep soils formed from volcanic ash residuum and colluvium. On the southeast slope of Pine Mountain a coarse pumice soil is included at the surface. Surface soils are typically sandy loam and subsoils are loams. Permeability is rapid to very rapid in the surface soil and rapid to moderate in the subsoil. Depth to bedrock is 18 to 40 inches.

Bedrock consists of stratified volcanics including andesites, basalts, breccias, and tuffs. Most of the material is competent.

Landtype 91 is similar to Landtype 6C except the slopes are steeper. It is similar to 7K but occurs on a drier site and lacks tree species. Landtype 49 is somewhat similar but occurs on shorter slopes and is underlain by sands and gravel.

Range of Soil Characteristics of Landtype 91

Litter:	Leaves, twigs, and decomposing organic matter; 0 to 0.5 inch.
Surface Layers:	Very dark grayish brown to brown sandy loam to loamy sand; weak, fine, granular structure to massive; 2 to 20 percent blocky and platy gravels and cobbles by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.5 to 7.2; 6 to 24 inches thick.
Subsoil Layers:	Dark brown to yellowish brown loam to sandy loam; massive to weak, medium, blocky structure; 20 to 60 percent blocky and platy cobbles, gravels, and stones by volume; nonsticky to sticky, nonplastic to plastic; pH 6.5 to 7.2; 6 to 30 inches thick.

MAPPING UNIT 92

Mapping Unit 92 consists of 70 percent or more of Landtype 92 and may have inclusions of Landtypes 15, 7E, and 7F.

Landtype 92 occurs on gentle side slopes of major volcanoes at high elevations. Slope gradients range from 0 to 30 percent, with 5 to 15 percent being most common. Elevation ranges from 5,800 to 6,500 feet, and the annual precipitation is about 25 to 35 inches.

Vegetation is composed of lodgepole pine, some mountain hemlock, and needlegrass. Ground cover is very sparse. This landtype has very low potential for timber production.

This landtype has excessively drained soils formed from a moderately thick to very thick layer of recent volcanic cinders over volcanic ash on basaltic lavas. Surface soils are thin cindery loamy sands and subsoils are very cindery sands. Buried soils are pumiceous loamy sands. Permeability is very rapid. Depth to bedrock is 40 to 100 or more inches.

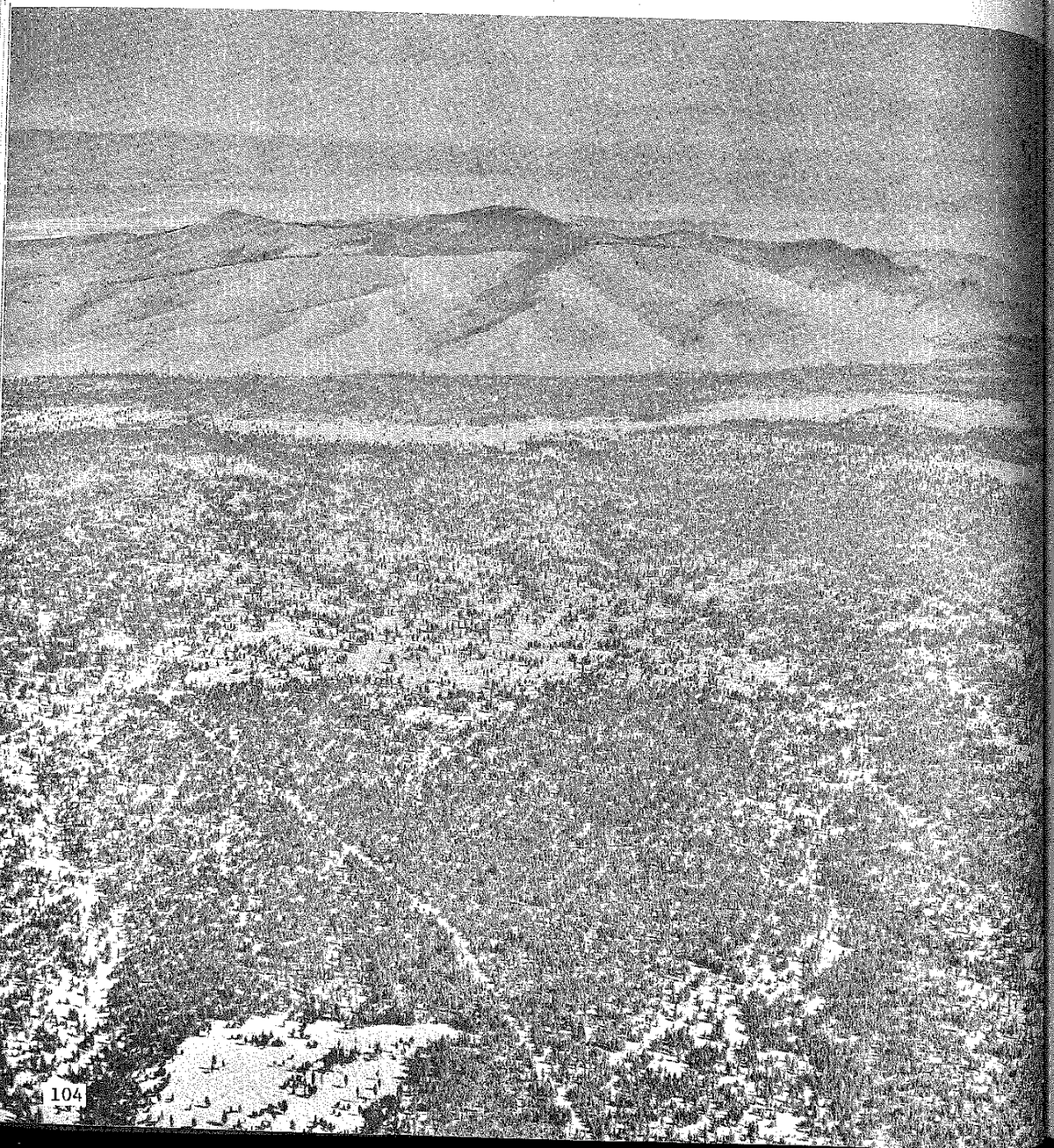
Bedrock consists of hard, highly to moderately fractured basaltic lavas. It is blocky and competent.

Landtype 92 is similar to Landtype 15 except the soils are coarser textured and the landform is different. Landtype 93 is similar but occurs at lower elevations and has different vegetation.

Range of Soil Characteristics of Landtype 92

Litter:	Needles, twigs, cones, and decomposing organic matter; 0 to 1 inch. Lacking over much of the area.
Surface Layers:	Brown to yellowish red cindery loamy sand to sand; massive to single grain; 30 to 70 percent cinder fragments by volume; nonsticky, nonplastic; pH 6.0 to 7.0; 6 to 10 inches thick.
Subsoil Layers:	Dark reddish brown to dark gray cindery sand to cinders; single grain; 60 to 95 percent cinder coarse fragments; nonsticky, nonplastic; pH 6.5 to 7.0; 20 to 80 or more inches thick.
Buried Soil:	Brown to yellowish brown pumiceous loamy sand to sand; massive; 5 to 30 percent pumice and blocky gravels and cobbles by volume; nonsticky, nonplastic; pH 6.8 to 7.0; 20 to 30 inches thick.

Figure 8. This is a view looking northeasterly to Pine Mountain, a unique geologic feature about 30 miles east of Bend. The outer slopes of this old volcanic system are nonforested, but the central portion supports stands of ponderosa pine. Geologically, the mountain may be considered a dacite dome. Soils on part of the mountain are composed primarily of pumice and volcanic ash, while other sites have finer soils which have weathered from the bedrock.



MAPPING UNIT 93

Mapping Unit 93 consists of 70 percent or more of Landtype 93 and may have inclusions of Landtypes 14, 64, and 6J.

Landtype 93 occurs on smooth to uneven lavaflow uplands or lava plains. Slope gradients are generally 5 to 15 percent but may range up to 30 percent. Elevation ranges from 4,000 to 5,000 feet, and the annual precipitation is about 18 to 25 inches.

Vegetation includes ponderosa pine, manzanita, snowbrush, bitterbrush, sedges, and needlegrass. Productivity is estimated at cubic foot Site Class 5 and Site Index 65 to 85 for ponderosa pine.

This landtype has excessively drained soils formed from a moderately thick to thick layer of cinders over volcanic ash and residuum. Surface soils are cindery loamy sands and cinders, and buried soils are pumiceous loamy sands and sandy loams. Permeability is very rapid in the surface soil and rapid to very rapid in the buried soil. Depth to bedrock is 50 to 100 or more inches.

Bedrock is highly to moderately fractured, blocky, black colored basaltic lava. It is hard and competent.

Landtype 93 is similar to Landtype 64 except it has a recent volcanic cinder surface soil. Landtype 92 is similar but occurs at higher elevations and has different vegetation.

Range of Soil Characteristics of Landtype 93

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0 to 2 inches thick.
Surface Layers:	Brown to yellowish brown loamy sand; single grain to weak, fine, crumb structure; 10 to 40 percent fine gravel-sized cinders; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 10 inches thick.
Subsoil Layers:	Brownish yellow to very dark gray, very cindery sand and cinders, single grain; 50 to 90 percent gravel sized cinder coarse fragments; nonsticky, nonplastic; pH 6.4 to 7.0; 20 to 80 inches or more thick.
Buried Soil Layers:	Dark brown to yellowish brown pumiceous loamy sands and sandy loams; massive, 2 to 20 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.5 to 7.0; 20 to 40 inches thick.
	Brown to yellowish brown sandy loam; massive; 10 to 50 percent blocky gravel, cobbles, and stones by volume; nonsticky, nonplastic; pH 6.5 to 7.0; 10 to 30 inches thick.

MAPPING UNIT 94

Mapping Unit 94 consists of 70 percent or more of Landtype 94 and may have inclusions of Landtypes 5, 16, 17, 19, 95, and "sand blowout" spots.

Landtype 94 occurs on uneven glaciated uplands at relatively high elevations. Slopes are generally smooth and complex and range up to about 40 percent gradient. Typical slopes are 10 to 20 percent. Elevation ranges from 4,400 to 4,900 feet, and the annual precipitation is about 50 to 80 inches.

Vegetation includes lodgepole pine, mountain hemlock, and true firs. A wide variety of forbs, grasses, sedges, and shrubs are present, including lupine, huckleberry, and beargrass. Productivity is estimated at cubic foot Site Class 5 and 6 and Site Index 30 to 40 for lodgepole pine.

This landtype has well to excessively drained soils derived from a moderately thick to very thick layer of black volcanic ash over glacial till. Surface soils are typically loamy sands, and subsoils are sands and cobbly sandy loams. Permeability of the sand deposit is very rapid and it is moderate to slow in the glacial till. Depth to bedrock is 36 to 200 inches.

Bedrock consists of hard, moderately fractured basalts and andesites. It is competent.

Landtype 94 is similar to Landtype 95 but has thicker ash soils, is at higher elevations, and has different vegetation. Landtypes 16 and 17 are similar but lack the black ash surface.

Range of Soil Characteristics of Landtype 94

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0.5 to 2 inches thick.
Surface Layers:	Dark brown loamy sand; weak, fine, crumb structure to massive or single grain; 0 to 2 percent coarse fragments; nonsticky, nonplastic; pH 6.0 to 6.8; 12 to 20 inches thick.
Subsoil Layers:	Black sand; single grain; 0 to 2 percent coarse fragments; nonsticky, nonplastic; pH 6.8 to 7.0; 20 to 60 inches thick.
Buried Soil:	Dark brown to yellowish brown pumiceous loamy sand and cobbly sandy loam; massive; 20 to 50 percent cobbles, stones, and gravel; nonsticky, nonplastic; pH 6.5 to 7.0; 10 to 30 inches thick over gray, compact glacial till or bedrock.

MAPPING UNIT 95

Mapping Unit 95 consists of 70 percent or more of Landtype 95 and may have inclusions of Landtypes 5, 23, 28, 30, 34, and 95.

Landtype 95 occurs on uneven glaciated uplands. Lakes and ponds are common. Slope gradients are 0 to 30 percent. Elevation ranges from 3,700 to 4,400 feet, and the annual precipitation is about 40 to 60 inches.

Vegetation is composed of mixed conifers including Douglas-fir, white fir, white pine, lodgepole pine, and ponderosa pine, over a wide variety of shrubs and forbs. Vine maple, Oregon grape, and huckleberry are typically found. Productivity is estimated at cubic foot Site Class 4 to 5 and Site Index 95 to 120 for Douglas-fir.

This landtype has well to excessively drained soils derived from a moderately thick to thick layer of black volcanic ash over glacial till. Surface soils are typically loamy sands, and subsoils are sands. Buried soils are cobbly sandy loams. Permeability is very rapid in the surface soils and subsoil, and rapid to moderate in the buried soil.

Landtype 95 is similar to Landtype 94 but occurs at lower elevations and has different vegetation. Landtype 28 is similar but does not have as thick of a black sand surface, and the vegetation is slightly different. Landtype 33 is similar to Landtype 95 except it has cindery surface soils.

Range of Soil Characteristics of Landtype 95

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1.5 to 3 inches thick.
Surface Layers:	Dark brown loamy sand; weak, fine, crumb structure to massive; 0 to 2 percent coarse fragments by volume; nonsticky, nonplastic; pH 6.2 to 6.8; 10 to 24 inches thick.
Subsoil Layers:	Black sand; single grain; 0 to 2 percent coarse fragments; nonsticky, nonplastic; pH 6.5 to 6.8; 20 to 40 inches thick.
Buried Soil:	Dark brown to brown loamy sand and cobbly sandy loam; massive; 5 to 50 percent cobbles, stones, and gravel by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.5 to 7.0; 24 to 40 inches thick over compact till.

MAPPING UNIT 96

Mapping Unit 96 consists of 70 percent or more of Landtype 96 and may have inclusions of Landtypes 15, 43, 44, 97, 9F, and 2B.

Landtype 96 occurs on smooth, nearly level outwash plains. Slope gradients are typically less than 5 percent but may range up to about 20 percent locally. Elevation ranges from 4,200 to 4,900 feet, and the annual precipitation is about 20 to 30 inches.

Vegetation is composed of lodgepole pine, bitterbrush, squirreltail, needlegrass, and sedges. Productivity is estimated at cubic foot Site Class 5 and Site Index 35 to 45 for lodgepole pine.

This landtype has excessively drained soils derived from a thick to very thick layer of pumice and volcanic ash over an older soil on glacial outwash deposits. Surface soils are thin pumiceous loamy sands, and subsoils are pumiceous sands. The buried soils are typically thin sandy loams and overlie gravelly glacial outwash.

Landtype 96 is similar to Landtype 45 except the pumice mantle is thicker and coarser, and vegetation is slightly different. Landtype 9F is similar but usually occurs on more of a slope and supports ponderosa pine.

Range of Soil Characteristics of Landtype 96

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0.5 to 1.5 inches thick.
Surface Layers:	Dark brown to yellowish brown pumiceous loamy sand; weak, fine, crumb structure to single grain; 10 to 30 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.2 to 6.8; 7 to 10 inches thick.
Subsoil Layers:	Brownish yellow pumiceous sand; single grain; 30 to 70 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.8 to 7.0; 20 to 40 inches thick.
	Light yellowish brown to olive brown pumiceous sand; single grain; 2 to 20 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.8 to 7.0; 15 to 40 inches thick.
Buried Soil:	Brown to strong brown sandy loam; massive; 10 to 50 percent subrounded gravels; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.5 to 7.0; 10 to 18 inches thick over outwash gravels and sand or lacustine sediments.

Included in this landtype are some pinkish-colored, very thick pumice flow deposits at the southern end of the Forest.

MAPPING UNIT 97

Mapping Unit 97 consists of 70 percent or more of Landtype 97 and may have inclusions of Landtypes 98, 9C, 9F, and 6B.

Landtype 97 occurs on gentle to moderately sloping lava plains and toeslopes of major volcanoes. Slope gradients range from 0 to 30 percent and are commonly 8 to 15 percent. Elevation ranges from 4,500 to 5,500 feet, and the annual precipitation is about 25 to 30 inches.

Vegetation includes ponderosa pine and lodgepole pine over bitterbrush, manzanita, sedges, squirreltail, and needlegrass. Some white fir and snowbrush occurs at the upper elevation limits. Productivity is estimated at cubic foot Site Class 4 to 5 and Site Index 75 to 90 for ponderosa pine.

This landtype has well to excessively drained soils formed from a thick (40 to 60 inches) pumice and ash layer over an older soil on basalts and andesites. Surface soils are pumiceous loamy coarse sands, and subsoils are pumiceous loamy coarse sands and sands. Buried soils are typically sandy loams. Permeability is very rapid in the pumice and ash layers and rapid in the buried soil. Depth to bedrock is 40 to 80 inches.

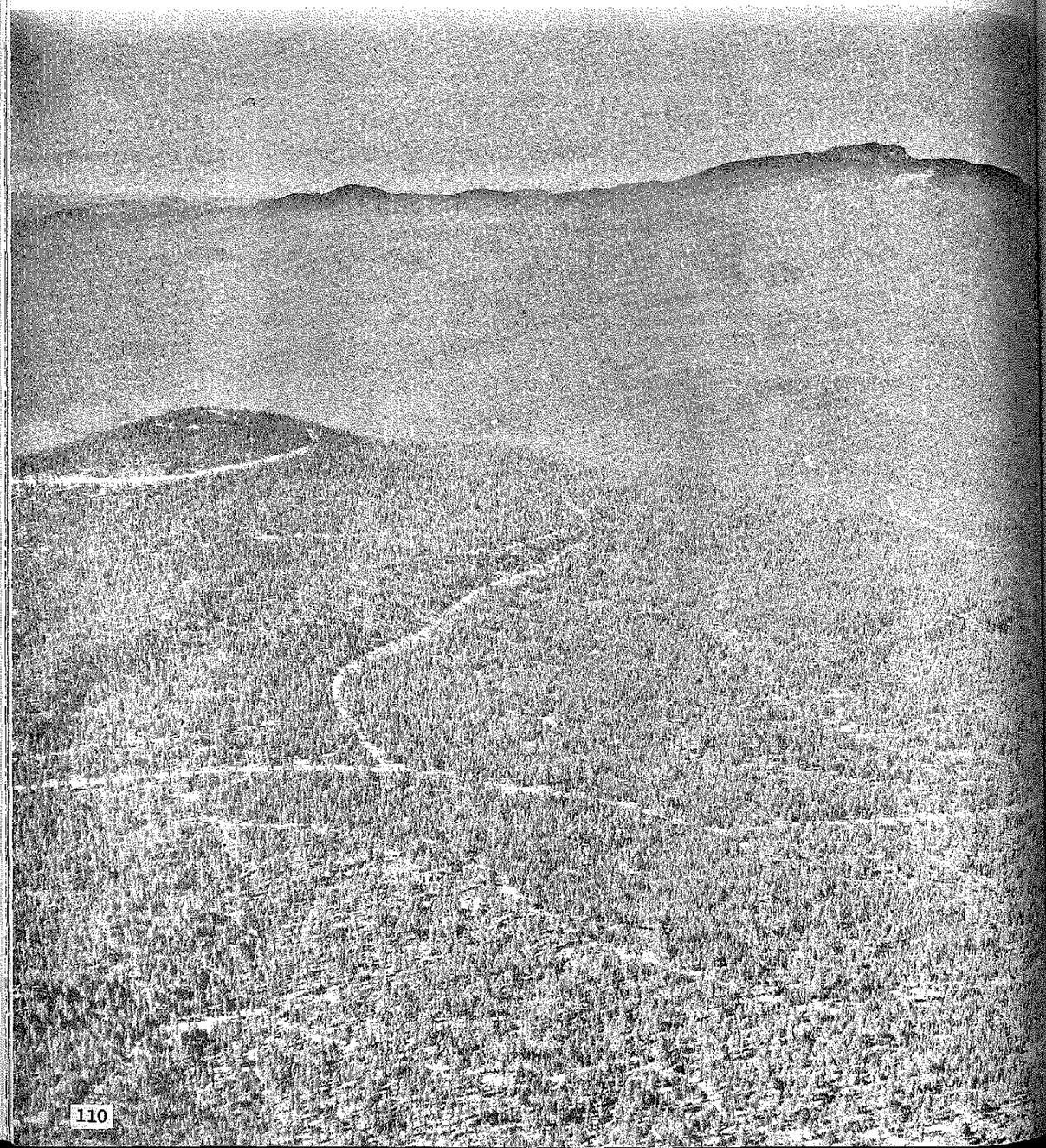
Bedrock consists of black to dark gray, highly to moderately fractured, blocky basalts and andesites. It is hard and competent.

Landtype 97 is similar to Landtypes 6B and 64 except the pumice mantle is thicker. It is similar to Landtype 9L only the pumice mantle is thinner. Landtype 9F is similar except for underlying materials.

Range of Soil Characteristics of Landtype 97

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 2 inches thick.
Surface Layers:	Dark brown to brown pumiceous loamy coarse sand; weak, fine, crumb structure to single grain; 10 to 40 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.2 to 6.8; 8 to 12 inches thick.
Subsoil Layers:	Brownish yellow to pale brown pumiceous loamy coarse sand to pumiceous sand; single grain, 30 to 60 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.7 to 7.0; 15 to 30 inches thick.
	Light yellowish brown to olive brown pumiceous sand; single grain; 2 to 10 percent pumice coarse fragments; nonsticky, nonplastic; pH 6.8 to 7.0; 8 to 20 inches thick.
Buried Soil:	Dark brown to strong brown loamy sand to loam; massive; 20 to 60 percent blocky cobbles, stones, and gravel by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.2 to 6.8; 6 to 24 inches thick.

Figure 9. The Paulina Mountains consist of a broad shield volcano dotted with many cinder cones and lava domes. This view looks westerly, with China Hat Butte in the foreground and South Paulina Peak in the upper right portion of the photo. Very coarse-textured pumice deposits called "Newberry pumice" cover the east slopes of the Paulina Mountains.



MAPPING UNIT 98

Mapping Unit 98 consists of 70 percent or more of Landtype 98 and may have inclusions of Landtypes 92, 9C, 9M, 67, and 97.

Landtype 98 occurs on gentle to moderately sloping lava plains and side slopes of major volcanoes. Slope gradients range from 0 to 30 percent and are commonly 10 to 20 percent. Elevation ranges from 4,500 to 6,000 feet, and the annual precipitation is about 25 to 35 inches.

Vegetation is composed of mixed conifers including white fir, Douglas-fir, ponderosa pine, and some sugar pine over snowbrush and chinquapin. Productivity is estimated at cubic foot Site Class 4 to 5 and Site Index 80 to 100 for ponderosa pine. Site Index is 45 to 55 for white fir, with a cubic foot Site Class of 4.

This landtype has well to excessively drained soils formed from a thick layer of pumice and volcanic ash over an older soil on basalts and andesites. Surface soils are typically pumiceous loamy sands and sands. The buried soil is usually a sandy loam. Permeability is very rapid in the pumice and ash layer and rapid in the buried soil. Depth to bedrock is 40 to 80 inches.

Bedrock typically consists of black to dark gray, highly to moderately fractured basalts and andesites. It is hard and competent.

Landtype 98 is similar to Landtypes 65 and 67 but has a thicker pumice soil mantle and vegetation is slightly different. It is similar to Landtype 97 but typically occurs at higher elevations and has different vegetation. Landtype 9M is similar but has a thicker and coarser textured pumice mantle. Landtype 9C is similar to Landtype 98 except it is underlain by glacial till instead of bedrock.

Range of Soil Characteristics of Landtype 98

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 3 inches thick.
Surface Layers:	Dark brown to brown pumiceous loamy coarse sand; weak, fine, crumb structure to single grain or massive; 10 to 40 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.0 to 6.8; 10 to 15 inches thick.
Subsoil Layers:	Yellowish brown to brownish yellow pumiceous coarse sand; single grain; 30 to 60 percent pumice coarse fragments by volume; pH 6.5 to 7.0; 15 to 30 inches thick.
	Pale brown to light brownish gray pumiceous coarse sand; single grain; 2 to 10 percent pumice coarse fragments by volume; pH 6.5 to 7.0; 8 to 20 inches thick.
Buried Soil:	Dark brown to dark reddish brown sandy loam to loam; massive; 20 to 60 percent blocky cobbles, stones, boulders, and gravel by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.2 to 6.8; 6 to 24 inches thick.

MAPPING UNIT 1A - Steep Rocky Slopes with Benches on Lava Domes at High Elevations

Mapping Unit 1A consists of 70 percent or more of Landtype 1A and may have inclusions of Landtypes 12 and 84.

Landtype 1A occurs on steep, rocky, single slopes on buttes in the Upper Forest Zone. The main slopes are 30 to 100 percent and some gentle slopes occur on narrow benches. Soils are very shallow to moderately deep along the slopes. They are coarse-textured and very stony. Deep, bouldery colluvium is found along the toeslopes. Rock outcrops of hard andesite, rhyolite, or basalt make up about 15 to 45 percent of the area. Mountain hemlock is the dominant tree species on this landtype. It is an unproductive to very low site for timber production.

MAPPING UNIT 2A

Mapping Unit 2A consists of 70 percent or more of Landtype 2A and may have inclusions of Landtypes 16, 17, and 7B.

Landtype 2A occurs on gently sloping glacial uplands. Slope gradients are commonly 5 to 10 percent but may range up to 30 percent. Elevation ranges from 5,000 to 5,500 feet, and the annual precipitation is estimated at 45 to 50 inches.

Vegetation is composed of lodgepole pine with some mountain hemlock, and true firs. Ground cover is sparse and includes needlegrass and sedges. Site quality is very low for timber production.

This landtype has well to excessively drained soils formed from a 1- to 3-foot layer of coarse pumice (Devil's Hill) over pumiceous volcanic ash (Mazama) on an older soil over glacial till. Surface soils are pumiceous loamy sands and gravel sized pumice. Subsoils are pumiceous loamy sands, and the buried soils are typically sandy loams. Permeability is very rapid in the surface pumice layers, rapid in the subsoil, and rapid to moderate in the buried soil. Below the buried soil there is typically compact glacial till which has slow to moderate permeability.

Landtype 2A is similar to Landtype 17 except it has a very coarse pumice surface layer. Landtype 7B is similar but occurs over lavas, and Landtype 2B is similar except it occurs at lower elevations and the pumice materials are different.

Range of Soil Characteristics of Landtype 2A

Litter:	Needles, twigs, cones, and decomposing organic matter; 0 to 1 inch thick.
Surface Layers:	Light gray to brown pumiceous loamy sand to pumiceous sand; weak, fine, crumb structure to single grain; 30 to 90 percent pumice coarse fragments up to about two inches in diameter: nonsticky, nonplastic; pH 5.8 to 6.5; 8 to 36 inches thick.
Subsoil Layers:	Strong brown to yellowish brown pumiceous loamy sand; massive to single grain; 2 to 10 percent pumice and sub rounded gravels by volume; nonsticky, nonplastic; pH 6.4 to 6.8; 12 to 24 inches thick.
Buried Soil:	Dark brown to brown loamy sand to loam; massive; 15 to 40 percent subrounded cobbles, stones, and gravel by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.2 to 6.6; 10 to 24 inches thick over unweathered, compact glacial till.

MAPPING UNIT 2B

Mapping Unit 2B consists of 70 percent or more of Landtype 2B and may have inclusions of Landtypes 2, 15, 17, 19, 96, 7F, and 9M.

Landtype 2B occurs on gently sloping glaciated uplands. Slope gradients are commonly 8 to 15 percent but range up to 30 percent. Elevation ranges from 5,000 to 6,000 feet, and the annual precipitation is about 35 to 45 inches.

Vegetation is composed dominantly of lodgepole pine, lupine, needlegrass, and pinemat manzanita. Ground cover is typically sparse. Some true firs and mountain hemlock are often associated with this landtype. Productivity is estimated at cubic foot Site Class 5 to 6 and Site Index 25 to 40 for lodgepole pine.

This landtype has excessively drained soils formed from a thick to very thick layer of pumice and volcanic ash over older soils on glacial till. Surface soils are typically pumiceous loamy coarse sands, and subsoils are pumiceous coarse sands. Permeability is very rapid in the pumice and ash layers and rapid to moderate in the buried soil. The unweathered till has slow to moderate permeability.

Landtype 2B is similar to Landtype 19 except the pumice mantel is coarser textured and thicker. It is similar to Landtype 9W but generally occurs at lower elevations and vegetation is different. Landtype 7F is similar except it occurs over volcanic bedrock materials and is typically higher in elevation.

Range of Soil Characteristics of Landtype 2B

Litter:	Needles, twigs, cones, and decomposing organic matter; 0 to 1 inch thick.
Surface Layers:	Dark brown to brown pumiceous loamy sand; weak, fine, crumb structure to massive or single grain; 15 to 30 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.2 to 6.8; 6 to 8 inches thick.
Subsoil Layers:	Yellowish red to light gray pumiceous coarse sand (mottled particles in upper portion); single grain; 10 to 90 percent pumice coarse fragments by volume; pH 6.5 to 7.0; 30 to 80 inches thick.
Buried Soil:	Dark brown to dark yellowish brown loamy fine sand to loam; massive; 20 to 40 percent subrounded cobbles, stones, and gravel by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.2 to 6.8; 0 to 20 inches thick over grayish colored unweathered glacial till.

MAPPING UNIT 4A

Mapping Unit 4A consists of 70 percent or more of Landtype 4A and may have inclusions of Landtypes 19, 42, and 7F.

Landtype 4A occurs on gently sloping plateaus and glacial outwash plains. Slope gradients are generally less than 10 percent but may range up to 30 percent. Elevation ranges from 5,500 to 6,200 feet, and the annual precipitation is about 25 to 30 inches.

Vegetation is composed dominantly of lodgepole pine and lupine. Productivity is estimated at cubic foot Site Class 5 to 6 and Site Index 30 to 40 for ponderosa pine.

This landtype has excessively drained soils formed from a moderately thick layer of pumiceous volcanic ash over an older soil on sands and gravels. Surface soils are typically pumiceous loamy sands, and buried soils are sandy loams and sandy gravels. Permeability is very rapid in the surface soils and rapid to very rapid in the buried soils.

Landtype 4A is similar to Landtypes 19 and 73 except for underlying material. It is similar to Landtype 42 except for vegetation.

Range of Soil Characteristics of Landtype 4A

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0.5 to 1 inch thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments and gravel; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 6 inches thick.
Subsurface Layers:	Brown to yellowish brown pumiceous loamy sand to sand; massive or single grain; 5 to 10 percent pumice coarse fragments and rounded gravels by volume; nonsticky, nonplastic; pH 6.0 to 7.8; 20 to 36 inches thick.
Buried Soil:	Brown to dark brown sandy loam to loamy sand; massive; 10 to 30 percent rounded gravels by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.2 to 6.8; 6 to 24 inches thick.
	Dark grayish brown gravelly loamy sand to sandy gravel; massive to single grain; 40 to 70 percent rounded and subrounded gravels by volume; nonsticky, nonplastic; pH 6.4 to 6.8; greater than 36 inches thick.

MAPPING UNIT 4C - Alluvial Fans in a Low Precipitation Zone

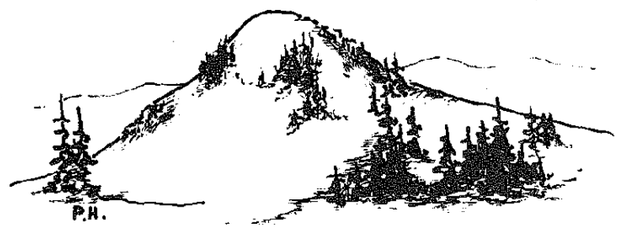
Mapping Unit 4C consists of 70 percent or more of Landtype 4C and may have inclusions of Landtypes 91, 6C, and 48.

Landtype 4C occurs on toeslopes, alluvial fans, and along draws on highly erosion, nonforested sites. Vegetation consists of sagebrush, rabbitbrush and bunchgrasses. Slopes are 5 to 40 percent. Soils are typically sandy loams and loams, but some coarse pumice may be included. Much of the soil material has been transported by past erosion, with bedrock being 3 to 10 feet. Bedrock may include hard andesites, rhyolites, and basalts; and tuffs and breccias. This unit occurs along the base of Pine Mountain.

MAPPING UNIT 5A - Tuff Ridges at High Elevations

Mapping Unit 5A consists of 70 percent or more of Landtype 5A and may have inclusions of Landtypes 3, 58, and 84.

Landtype 5A occurs on steep, single slopes on tuffs and breccias in the Upper Forest Zone. Vegetation consists of mountain hemlock and true firs. Soils are very shallow to deep and are composed primarily of volcanic ash and pumice. Slopes are 30 to 80 percent. Rock outcrops are common, and the ridge tops are very narrow. Soils on the ridge tops are very shallow or lacking.



MAPPING UNIT 6A

Mapping Unit 6A consists of 70 percent or more of Landtype 6A and may have inclusions of Landtypes 6G, 41, 64, and 72.

Landtype 6A occurs on gently sloping lava plains. Slope gradients are typically less than 15 percent but may range up to 30 percent. Elevation ranges from 4,500 to 5,000 feet, and the annual precipitation is about 14 to 17 inches.

Vegetation is composed dominantly of ponderosa pine, bitterbrush, rabbitbrush, Idaho fescue, and cheatgrass. Productivity is estimated at cubic foot Site Class 5 to 6 and Site Index 50 to 70 for ponderosa pine.

This landtype has excessively drained soils formed from a moderately thick layer of pumiceous volcanic ash over residuum. Surface soils are typically pumiceous loamy sands, and buried soils are sandy loams. Permeability is very rapid in the surface soils and rapid in the buried soil. Depth to bedrock is 24 to 50 inches.

Bedrock consists of highly to moderately fractured, blocky to platy, basalts and andesites. It is hard and competent.

Landtype 6A is similar to Landtypes 72 and 64 except for vegetation, and lies between them in elevational sequence. Landtype 41 is similar except for underlying materials and slight differences in vegetation.

Range of Soil Characteristics of Landtype 6A

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0.5 to 2 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments and gravel; nonsticky, nonplastic; pH 6.0 to 6.8; 2 to 10 inches thick.
Sub-surface Layers:	Dark brown to yellowish brown pumiceous loamy sand; massive to single grain; 2 to 20 percent pumice coarse fragments and blocky to platy gravels and cobbles by volume; nonsticky, nonplastic; pH 6.4 to 7.0; 18 to 30 inches thick.
Buried Soil:	Brown to dark brown sandy loam to loam; massive; 20 to 70 percent blocky to platy cobbles, stones, and gravels by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.5 to 7.0; 6 to 30 inches thick.

MAPPING UNIT 6B

Mapping Unit 6B consists of 70 percent or more of Landtype 6B and may have inclusions of Landtypes 64, 65, 70, and 97.

Landtype 6B occurs on gentle to moderately sloping lava plains. Slope gradients are commonly 5 to 10 percent, but may range up to 30 percent. Elevation ranges from 4,500 to 5,700 feet, and the annual precipitation is about 20 to 30 inches.

Vegetation is composed dominantly of ponderosa pine and lodgepole pine. The shrubs and ground cover include a variety of species including bitterbrush, snowbrush, manzanita, sedges, squirreltail, and needlegrass. Productivity is estimated at cubic foot Site Class 4 to 5 and Site Index 70 to 90 for ponderosa pine, and 40 to 50 for lodgepole pine.

This landtype has well to excessively drained soils derived from a moderately thick layer of pumice and volcanic ash over residuum on basalts. Surface soils are typically pumiceous loamy sands, and the buried soils are sandy loams. Permeability is very rapid in the surface soil and rapid in the buried soil. Depth to bedrock is 24 to 50 inches.

Bedrock consists of black to dark gray, highly to moderately fractured, blocky basaltic lavas. It is hard and competent.

Landtype 6B is similar to Landtypes 64 and 65 except for vegetation. It has a mixture of ponderosa pine and lodgepole pine, while Landtype 64 has dominantly ponderosa pine and Landtype 65 includes firs. The slopes are often more gentle on Landtype 6B than on Landtypes 64 and 65. Landtype 70 is somewhat similar but typically lacks ponderosa pine and has less varied ground cover.

Range of Soil Characteristics of Landtype 6B

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 2 inches thick.
Surface Layers:	Dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments; nonsticky, nonplastic; pH 6.0 to 6.5; 2 to 6 inches thick.
Sub-surface Layers:	Strong brown to yellowish brown pumiceous loamy sand to pumiceous coarse sand; massive and single grain; 2 to 20 percent pumice coarse fragments and blocky gravels, cobbles, and stones by volume; nonsticky, nonplastic; pH 6.2 to 6.8; 18 to 32 inches thick.
Buried Soil:	Dark brown to yellowish brown loamy fine sand to loam; massive; 20 to 60 percent blocky cobbles, stones, and gravels by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.4 to 6.8; 8 to 24 inches thick.

MAPPING UNIT 6C

Mapping Unit 6C consists of 70 percent or more of Landtype 6C and may have inclusions of Landtypes 48, 53, 60, 91, and 7K.

Landtype 6C occurs on gentle to moderately sloping lava plains in a low precipitation zone. Slope gradients are 0 to 30 percent, although most commonly fall between 5 and 15 percent. Elevation ranges from 5,000 to 5,400 feet, and the annual precipitation is about 10 to 12 inches.

Vegetation is composed dominantly of sagebrush, rabbitbrush, wheatgrasses, Idaho fescue, and cheatgrass. A few juniper and ponderosa pine may be present. It is relatively unproductive for timber production.

This landtype has well to excessively drained soils formed from a thin layer of volcanic ash on residuum over basalts and andesites. Surface soils are typically sandy loams, and subsoils are loams. Permeability is rapid in the surface soil and moderate in the subsoil. Depth to bedrock is 18 to 40 inches.

Bedrock is composed of highly to moderately fractures, blocky to platy, basalts and andesites. It is hard and competent. Colors are typically black to dark gray.

Landtype 6C is similar to Landtype 48 except for underlying materials. It is similar to Landtype 53 but it has deeper soils. Landtype 60 is similar but usually occurs at slightly higher elevations and supports a timber stand.

Range of Soil Characteristics of Landtype 6C

Litter:	Leaves, twigs, and decomposing organic matter; 0 to 0.5 inch thick.
Surface Layers:	Very dark grayish brown to brown sandy loam to loamy fine sand; weak, fine, granular structure to massive; 2 to 20 percent blocky or platy cobbles, stones, and gravel by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.5 to 7.2; 6 to 20 inches thick.
Subsoil Layers:	Dark brown to brown loam to sandy loam; massive; 20 to 60 percent blocky or platy cobbles, stones, and gravel by volume; sticky to nonsticky, plastic to nonplastic; pH 6.8 to 7.5; 10 to 24 inches thick.

MAPPING UNIT 6E

Mapping Unit 6E consists of 70 percent or more of Landtype 6E and may have inclusions of Landtypes 7G, 7E, 73, and 10.

Landtype 6E occurs on moderately steep side slopes of shield or composite volcanoes. Slopes are typically single, slightly to moderately dissected, and have a gradient of 10 to 40 percent. Elevation ranges from 6,000 to 6,500 feet, and the annual precipitation is about 25 to 30 inches.

Vegetation is composed dominantly of lodgepole pine, needlegrass, and lupine. Productivity is estimated at cubic foot Site Class 6 and Site Index 25 to 35 for lodgepole pine.

This landtype has well to excessively drained soils derived from a moderately thick to thick layer of pumice over a moderately thick layer of pumiceous volcanic ash over residuum and colluvium on complex volcanics. Surface soils are typically pumiceous loamy sands, and buried soils are sandy loams. Permeability is very rapid in the pumice and ash layers and rapid in the residual soil. Depth to bedrock is 40 to 120 inches.

Bedrock consists of undifferentiated volcanic rocks including basaltic lavas, tuffs, breccias, and pumice flow materials.

Landtype 6E is similar to Landtype 7G but generally occurs at slightly lower elevations and has different surface soil materials. Landtype 7E is similar but generally occurs on more gentle slopes and the surface soils are different.

Range of Soil Characteristics of Landtype 6E

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0.5 to 1 inch thick.
Surface Layers:	Dark brown to light brown pumiceous loamy sand; weak, fine, crumb structure to massive or single grain; 20 to 70 percent pumice coarse fragments, commonly 1 to 3 inches in diameter; nonsticky, nonplastic; pH 6.0 to 6.8; 15 to 50 inches thick.
Subsoil Layers:	Dark brown to strong brown pumiceous loamy sand; massive to single grain; 2 to 20 percent pumice coarse fragments by volume, mostly less than ½ inch in diameter; nonsticky, nonplastic; pH 6.8 to 7.0; 15 to 30 inches thick.
Buried Soil:	Brown to dark brown sandy loam to loamy fine sand; massive; 20 to 60 percent blocky cobbles, stones, and gravels by volume; nonsticky to slightly sticky; nonplastic to slightly sticky; pH 6.4 to 6.8; 0 to 24 inches thick.

MAPPING UNIT 6G - Frost Pockets in the Ponderosa Pine Zone

Mapping Unit 6G consists of 70 percent or more of Landtype 6G and may have inclusions of Landtypes 6A, 64, and 72.

Landtype 6G consists of frost pockets within ponderosa pine plant communities. The landtype typically occurs in depressions associated with Landtypes 6A, 64, and 72. Slopes are generally less than 10 percent. Vegetation is typically low density ponderosa pine, rabbitbrush, needlegrass, squirreltail, and some bitterbrush. Soils are moderately deep to deep pumiceous loamy sands and sands, and generally overlay a residual soil over basaltic lavas. There are revegetation limitations in this landtype due to the frost hazard.



MAPPING UNIT 6H

Mapping Unit 6H consists of 70 percent or more of Landtype 6H and may have inclusions of Landtypes 19, 25, 65, 69, and 73.

Landtype 6H occurs on gentle to moderately sloping lava plains and toeslopes of buttes. Slope gradients are 0 to 30 percent. Elevation ranges from 5,400 to 6,000 feet, and the annual precipitation is about 30 to 40 inches.

Vegetation is composed mostly of white fir and lodgepole pine over sedges, princess pine, currant, and some snowbrush. Small amounts of ponderosa pine may be included. Productivity is estimated at cubic foot Site Class 5 to 6 and Site Index 35 to 45 for lodgepole pine. Site Index is 40 to 45 for white fir and the cubic foot Site Class is 5.

This landtype has well to excessively drained soils derived from a moderately thick layer of pumice and volcanic ash over residuum on basalts and andesites. Surface soils are typically pumiceous loamy sands, and the buried soils are sandy loams. Permeability is very rapid in the surface soils and rapid in the buried soil. Depth to bedrock is 24 to 50 inches.

Bedrock consists of black to dark gray, highly to moderately fractured, blocky basalts and andesites. It is hard and competent.

Landtype 6H is similar to Landtype 65 except it occurs at higher elevations and has different vegetation. It is similar to Landtype 73 but supports more white fir and less lodgepole pine, and generally occurs on more sloping lands when found at about the same elevational level. Landtype 25 is similar to Landtype 6H but occurs on glacial till instead of bedrock and often supports more ponderosa pine.

Range of Soil Characteristics of Landtype 6H

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0.5 to 2 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments; nonsticky, nonplastic; pH 6.0 to 6.5; 2 to 6 inches thick.
Subsurface Layers:	Strong brown to yellowish brown pumiceous loamy sand to pumiceous sand; massive to single grain; 2 to 20 percent pumice coarse fragments and blocky gravel and cobbles by volume; nonsticky; nonplastic; pH 6.0 to 7.0; 20 to 36 inches thick.
Buried Soil:	Brown to dark brown loamy fine sand to loam; massive; 20 to 60 percent blocky cobbles, stones, and gravels by volume; pH 6.3 to 6.8; 6 to 24 inches thick.

MAPPING UNIT 6J

Mapping Unit 6J consists of 70 percent or more of Landtype 6J and may have inclusions of Landtypes 15, 63, 64, and 41.

Landtype 6J occurs on gently sloping lava plains. Slope gradients are commonly 5 to 10 percent, but may range up to 30 percent. Elevation ranges from 4,800 to 5,200 feet, and the annual precipitation is about 18 to 25 inches.

Vegetation is composed dominantly of a mixture of ponderosa pine and lodgepole pine over bitterbrush, Idaho fescue, needlegrass, and squirreltail. Productivity is estimated at cubic foot Site Class 5 and Site Index 65 to 80 for ponderosa pine and 40 to 50 for lodgepole pine.

This landtype has well to excessively drained soils formed from a moderately thick layer of pumice and volcanic ash over residual soil on basaltic lavas. Surface soils are typically pumiceous loamy sands, and buried soils are sandy loams. Permeability is very rapid in the surface soils and rapid in the buried soil. Depth to bedrock is 30 to 50 inches.

Bedrock consists dominantly of black to dark gray, highly to moderately fractured, blocky basalts or andesites. It is hard and competent.

Landtype 6J is similar to Landtypes 63 and 64, and typically lies between them in elevational sequence. Landtype 6J differs from Landtype 63 by supporting more ponderosa pine, and it differs from Landtype 64 by supporting more lodgepole pine. Landtype 41 is similar except for underlying materials.

Range of Soil Characteristics of Landtype 6J

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 2 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice and gravel by volume; nonsticky, nonplastic; pH 6.0 to 6.8; 3 to 8 inches thick.
Subsurface Layers:	Dark brown to yellowish brown pumiceous loamy sand to pumiceous coarse sand; weak, fine, crumb structure to massive or single grain; 2 to 20 percent pumice coarse fragments and blocky gravels and cobbles by volume; nonsticky, nonplastic; pH 6.2 to 7.0; 18 to 32 inches thick.
Buried Soil:	Brown to dark brown loamy fine sand to loam; massive; 20 to 60 percent blocky cobbles, stones, and gravel by volume; nonsticky to slightly sticky, nonplastic to plastic; pH 6.4 to 6.8; 6 to 24 inches thick.

MAPPING UNIT 7A

Mapping Unit 7A consists of 70 percent or more of Landtype 7A and may have inclusions of Landtypes 1, 11, 14, 7E, 77, 85, and 92.

Landtype 7A occurs on rough, uneven lavaflow lands at high elevations. Overall slope gradients are commonly 5 to 15 percent, but there are many short, steep pitches. Rock outcrops are common to abundant. Elevation ranges from 5,800 to 7,000 feet. The annual precipitation is estimated at 25 to 35 inches.

Vegetation consists dominantly of lodgepole pine and mountain hemlock over needlegrass, sedges, lupine, and currant. It is a very low site for timber production.

This landtype has excessively drained, very stony, coarse textured soils formed from a moderately thick layer of pumice and volcanic ash over highly fractured basaltic lavas. The soils are typically very cobbly pumiceous loamy sands. Permeability is very rapid. Depth of soil is 10 to 40 inches.

Bedrock consists of black to dark gray, highly fractured, blocky basalts. It is hard and competent.

Landtype 7A is similar to Landtypes 74, 75, 76, 77 with the exception of vegetation and elevation. Landtype 7F is somewhat similar but the soils are not as stony. Landtype 7B is similar but has a coarser pumice layer at the surface. It is similar to Landtype 11, but supports a denser timber stand.

Range of Soil Characteristics of Landtype 7A

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0.5 to 1.5 inches thick.
Surface Layers:	Very dark grayish brown to light yellowish brown, very cobbly to stony pumiceous loamy sands and sands; weak, fine, crumb structure to single grain; 2 to 15 percent pumice coarse fragments and 40 to 80 percent blocky cobbles, stones, and gravel by volume; nonsticky, nonplastic; pH 6.0 to 7.0; 10 to 40 inches thick.
Buried Soil:	Older soils are generally not present below the pumice and ash layer.

MAPPING UNIT 7B

Mapping Unit 7B consists of 70 percent or more of Landtype 7B and may have inclusions of Landtypes 2A, 11, and 7A.

Landtype 7B occurs on rough, uneven lavaflow lands. Overall slope gradients are commonly 5 to 15 percent, but there are many short, steep pitches. Rock outcrops are common. Elevation ranges from 5,500 to 6,000 feet, and the annual precipitation is about 50 to 60 inches.

Vegetation consists dominantly of lodgepole pine and mountain hemlock over grouse huckleberry and sedges. Site quality for timber production is very low to unproductive.

This landtype has excessively drained, very stony, coarse-textured soils formed from a thin to moderately thick layer of coarse pumice (Devil's Hill) and a thin to moderately thick layer of pumiceous volcanic ash (Mazama) over highly fractured basaltic lavas. Surface soils are gravelly pumiceous loamy sands and sandy pumice gravels, and buried soils are very cobbly pumiceous loamy sands. Permeability is very rapid. Depth to bedrock is 24 to 50 inches.

Bedrock consists of black to dark gray, highly fractured, blocky basaltic lavas. It is hard and competent.

Landtype 7B is similar to Landtype 7A except for surface soil materials. It is similar to Landtype 2A except for landform and underlying materials.

Range of Soil Characteristics of Landtype 7B

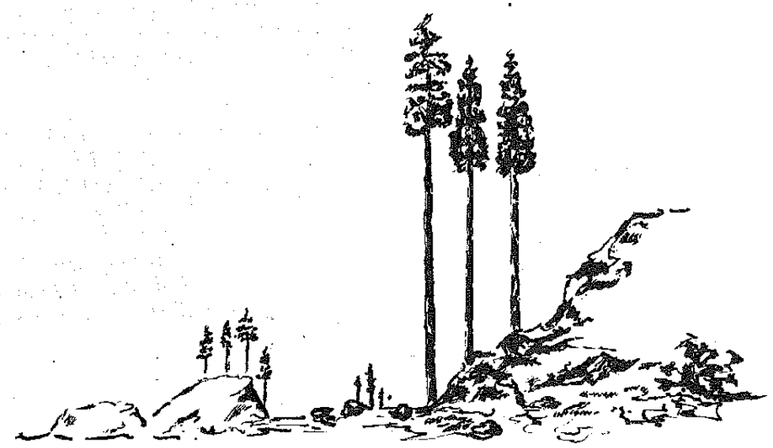
Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0.5 to 1.5 inches thick.
Surface Layers:	Dark grayish brown to gray pumiceous loamy sand; weak, fine, crumb structure; 10 to 40 percent pumice coarse fragments; nonsticky, nonplastic; pH 5.5 to 6.0; 1 to 3 inches thick.
Sub surface Layers:	Grayish brown to gray gravelly pumiceous loamy sand to sandy pumice gravel, single grain; 30 to 90 percent pumice and andesite gravels by volume, commonly ½ to 1½ inches in diameter; nonsticky, nonplastic; pH 5.8 to 6.5; 12 to 30 inches thick.
	Strong brown to yellowish brown, very cobbly to stony pumiceous loamy sands and sands; massive to single grain; 2 to 15 percent pumice coarse fragments and 40 to 80 percent blocky cobbles, stones, and gravels by volume; nonsticky, nonplastic; pH 6.2 to 7.0; 10 to 30 inches thick.

MAPPING UNIT 7C - Rough Lava Flow with Very Coarse Pumice

Mapping Unit 7C consists of 70 percent or more of Landtype 7C and may have inclusions of Landtypes 15, 9V, 11, and 75.

Landtype 7C is a miscellaneous landtype which occurs on rough, uneven lavaflows which have received a coarse Newberry pumice air-fall deposit. The soils are 70 to 98 percent pumice particles up to about 1½ inches in diameter. Soil depth ranges from very shallow to deep, and rock outcrops are common. The elevation ranges from 4,700 to 4,900 feet, and the annual precipitation is about 10 inches. Vegetation is composed of low density lodgepole pine and sagebrush. Productivity for timber is very low.

Landtype 7C is similar to Landtype 7J but occurs on lavas instead of waterlain sands and gravels.



MAPPING UNIT 7E

Mapping Unit 7E consists of 70 percent or more of Landtype 7E and may have inclusions of Landtypes 15, 70, 74, 76, and 7F.

Landtype 7E occurs on lava plains and gentle to moderately steep side slopes of major volcanoes. Slope gradients are 0 to 30 percent, with most of the area being less than 20 percent. Elevation ranges from 5,500 to 6,200 feet, and the annual precipitation is about 20 to 30 inches.

Vegetation is composed dominantly of lodgepole pine, needlegrass, and low density bitterbrush. Productivity is estimated at cubic foot Site Class 6 and Site Index 30 to 35 for lodgepole pine.

This landtype has excessively drained soils formed from a moderately thick layer of pumice and volcanic ash over a thin residual soil on basaltic lavas. Surface soils are typically pumiceous loamy sands, and buried soils are sandy loams. Permeability is very rapid in the surface soils and rapid to very rapid in the buried soils. Depth to bedrock is 24 to 50 inches.

Bedrock consists of black to dark gray, highly to moderately fractured, blocky basaltic lavas. It is hard and competent.

Landtype 7E is similar to Landtype 70 but generally occurs at higher elevations and has different ground cover vegetation. Landtype 15 has similar vegetation but the landform is different and the timber tends to be lower in density. Landtype 7F is similar but occurs at higher elevations and has different vegetation.

Range of Soil Characteristics of Landtype 7E

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0.25 to 1 inch thick.
Surface Layers:	Dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice coarse fragments, gravel and cobbles; nonsticky, nonplastic; pH 6.0 to 6.5; 2 to 6 inches thick.
Sub-surface Layers:	Brown to brownish yellow pumiceous loamy sand to sand; single grain to massive; 5 to 20 percent pumice coarse fragments and blocky gravels and cobbles; nonsticky, nonplastic; pH 6.2 to 7.0; 18 to 36 inches thick.
Buried Soil:	Dark yellowish brown to brown loamy sand to sandy loam; 20 to 80 percent blocky cobbles and stones by volume; nonsticky, nonplastic; pH 6.2 to 6.8; 6 to 20 inches thick.

MAPPING UNIT 7F

Mapping Unit 7F consists of 70 percent or more of Landtype 7F and may have inclusions of Landtypes 17, 7E, and 85.

Landtype 7F occurs on lava plains and side slopes of shield volcanoes. Slopes are smooth to uneven with a gradient of 0 to 30 percent. Generally, the slopes are less than 20 percent. Elevation ranges from 6,200 to 6,800 feet, and the annual precipitation may range from about 30 to 60 inches.

Vegetation is composed dominantly of lodgepole pine with some mountain hemlock over sedges, needlegrass, and grouse huckleberry. This landtype has low potential for timber production.

This landtype has well to excessively drained soils formed from a moderately thick layer of pumice and volcanic ash over an older soil on basalts and andesites. Surface soils are typically pumiceous loamy sands, and buried soils are sandy loams. Permeability is very rapid in the surface soils and rapid to very rapid in the buried soils. Depth to bedrock is 24 to 50 inches.

Bedrock consists of black to dark gray, highly to moderately fractured, blocky basalts and andesites. It is hard and competent.

Landtype 7F is similar to Landtype 7E but occurs at higher elevations and has different vegetation. Landtype 85 is similar but supports a dominance of mountain hemlock over lodgepole pine and the slopes tend to be slightly steeper than on Landtype 7F. The soils of Landtype 7F are not as stony as Landtype 7A, and surface materials are different than in Landtype 7B.

Range of Soil Characteristics of Landtype 7F

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0.25 to 1 inch thick.
Surface Layers:	Dark grayish brown to dark brown sandy loam to loamy sand; weak, fine, crumb structure; 0 to 15 percent pumice fragments and gravel; nonsticky, nonplastic; pH 5.8 to 6.5; 2 to 6 inches thick.
Sub-surface Layers:	Brown to brownish yellow pumiceous loamy sand to sand; single grain to massive; 5 to 20 percent pumice coarse fragments and blocky gravels and cobbles; nonsticky, nonplastic; pH 6.0 to 6.8; 18 to 36 inches thick.
Buried Soil:	Dark yellowish brown to brown loamy sand to sandy loam; 20 to 80 percent blocky cobbles and stones by volume; nonsticky, nonplastic; pH 6.2 to 6.8; 6 to 20 inches thick.

MAPPING UNIT 7G

Mapping Unit 7G consists of 70 percent or more of Landtype 7G and may have inclusions of Landtypes 9K, 9W, and 7F.

Landtype 7G occurs on smooth to slightly dissected single slopes on composite volcanoes. Slope gradients are 10 to 40 percent, with 20 to 30 percent being common. Elevation ranges from 6,300 to 6,500 feet, and the annual precipitation is around 30 inches.

Vegetation is composed mostly of lodgepole pine and needlegrass with some mountain hemlock. This landtype has low potential for timber production.

This landtype has excessively drained soils formed from a thin to thick layer of coarse textured pumice (Newberry) over pumiceous volcanic ash and older soils on complex volcanic bedrock materials. Surface soils are typically pumice gravels, and buried soils are loamy sands. Permeability is very rapid. Depth to bedrock is 24 to 80 inches.

Bedrock consists of undifferentiated volcanic materials including basalts, andesites, tuffs, and breccias.

Landtype 7G is similar to Landtypes 6E and 7F but the soil materials are different. Slopes are also steeper on Landtype 7G than on Landtype 7F. Landtype 7B is similar but differs in landform and has more uniform bedrock materials.

Range of Soil Characteristics of Landtype 7G

Litter:	Needles, twigs, cones, and decomposing organic matter; 0 to 1 inch thick.
Surface Layers:	Brown to gray pumiceous loamy sand and pumice gravels; single grain; 50 to 95 percent gravel sized pumice coarse fragments by volume; nonsticky, nonplastic; pH 5.8 to 6.5; 20 to 60 inches thick.
Subsoil Layer:	Brown to yellowish brown pumiceous loamy sand to sandy loam; massive to single grain; 15 to 50 percent pumice and blocky to platy cobbles, stones, and gravels by volume; pH 6.5 to 6.8; 10 to 20 inches thick.

MAPPING UNIT 7H

Mapping Unit 7H consists of 70 percent or more of Landtype 7H and may have inclusions of Landtypes 61, 78, and 7K.

Landtype 7H occurs on steep, smooth to slightly dissected slopes on composite volcanoes. Aspects are typically northerly, and slope gradients are 25 to 50 percent. Elevation ranges from 5,200 to 6,000 feet, and the annual precipitation is about 15 to 25 inches.

Vegetation includes ponderosa pine, Idaho fescue, lupine, bluebunch, wheatgrass; and some bitterbrush, goldenweed, and sagebrush. Productivity is estimated at cubic foot Site Class 5 to 6 and Site Index 60 to 75 for ponderosa pine.

This landtype has well to excessively drained soils derived from a thin to moderately thick layer of volcanic ash over residuum and colluvium. Surface soils are typically sandy loams, and subsoils are loamy sand. Permeability is very rapid in the surface soil and rapid in the subsoil. Depth to bedrock is 24 to 50 inches.

Bedrock consists dominantly of grayish colored basalts and andesites with inclusions of tuffs and breccias. It ranges from highly fractured to slightly fractured, and from competent to moderately competent.

Landtype 7H is similar to Landtype 68 except for aspect and vegetation. Landtype 7K is similar, but has different ground cover vegetation and is typically on south slopes.

Range of Soil Characteristics of Landtype 7H

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 2 inches thick.
Surface Layers:	Very dark grayish brown to dark brown sandy loam to loamy fine sand; weak, fine, granular structure to massive; 5 to 20 percent platy and blocky gravel, cobbles, and stones by volume; nonsticky, nonplastic; pH 6.2 to 7.0; 3 to 6 inches thick.
Sub-surface Layers:	Brown to dark yellowish brown sandy loam to loamy sand; massive to single grain; 10 to 30 percent platy and blocky, gravel, cobbles and stones by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.5 to 7.0; 10 to 24 inches thick.
Buried Soil:	Brown to dark brown sandy loam; massive; 30 to 60 percent platy and blocky gravel, cobbles, and stones by volume; slightly sticky, slightly plastic to nonplastic; pH 6.5 to 7.0; 6 to 20 inches thick.

MAPPING UNIT 7J

Mapping Unit 7J consists of 70 percent or more of Landtype 7J and may have inclusions of Landtypes 7, 7A, 15, and 48.

Landtype 7J occurs on gently sloping outwash plains or old lake beds and beach ridges. Slope gradients are 0 to 10 percent. Elevation ranges from 4,700 to 4,900 feet, and the annual precipitation is about 10 inches.

Vegetation is composed dominantly of lodgepole pine over sagebrush and needlegrass. This landtype has a very low potential for timber production.

This landtype has excessively drained soils formed from a thin to moderately thick layer of coarse textured Newberry pumice over a thin volcanic ash soil on waterlain sands and gravels. Surface soils are typically pumice gravels, and subsoils are sandy loams. Permeability is very rapid in the surface soils and rapid to very rapid in the subsoils.

Landtype 7J is similar to Landtype 7C, but occurs on waterlain sands and gravels instead of lavas. Landtype 48 is similar except for surface materials and the lack of lodgepole pine.

Range of Soil Characteristics of Landtype 7J

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0 to 1 inch thick.
Surface Layers:	Brown to gray pumiceous loamy sand to pumice gravel; single grain; 30 to 90 percent pumice coarse fragments, commonly ½ to 1 inch in diameter; nonsticky, nonplastic; pH 6.5 to 7.0; 8 to 30 inches thick.
Subsoil Layer:	Dark brown to brown loamy sand to sandy loam; massive; 5 to 20 percent subrounded gravels by volume; nonsticky, to slightly sticky, nonplastic to slightly plastic; pH 6.5 to 7.0; 12 to 20 inches thick.
Buried Soil:	Brown to dark grayish brown gravelly loamy sand to sandy gravel; single grain; 20 to 60 percent subrounded and rounded gravels by volume; nonsticky, nonplastic; pH 6.8 to 7.0; greater than 36 inches thick.

MAPPING UNIT 7K

Mapping Unit 7K consists of 70 percent or more of Landtype 7K and may have inclusions of Landtypes 6C, 7H, 68, 78, and 91.

Landtype 7K occurs on steep, smooth to slightly dissected side slopes of buttes and lava ridges. Slope gradients are 30 to 70 percent. Aspects are variable. Elevation ranges from 5,400 to 6,000 feet, and the annual precipitation is about 12 to 15 inches.

Vegetation is composed dominantly of ponderosa pine, sagebrush, bitterbrush, manzanita, and Idaho fescue. Productivity is estimated at cubic foot Site Class 6, and Site Index 40 to 65 for ponderosa pine.

This landtype has excessively to well drained soils formed from a thin to moderately thick layer of volcanic ash over residuum. Surface soils are typically sandy loams, and subsoils are loams. Permeability is rapid to very rapid in the surface soil and rapid to moderate in the subsoil. Depth to bedrock is 18 to 40 inches.

Bedrock consists dominantly of black to pinkish colored basalts, andesites, and rhyolites. It is highly to moderately fractured, blocky to platy, hard, and competent. Inclusions of tuffs and breccias are also present.

Landtype 7K is similar to Landtype 78 but occurs in a lower precipitation zone and has different vegetation. It is similar to Landtype 72 except it occurs on steeper slopes and soils tend to be finer textured. Landtype 60 is similar but occurs on more gentle slopes.

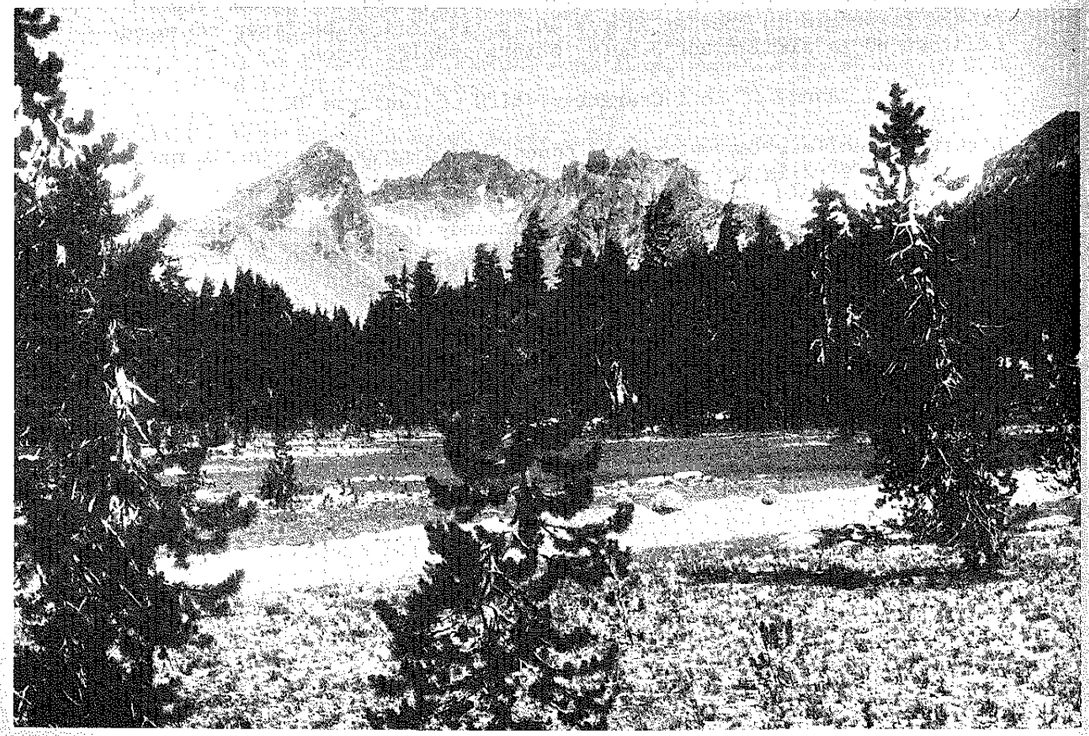
Range of Soil Characteristics of Landtype 7K

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0 to 2 inches thick.
Surface Layers:	Very dark brown to dark brown sandy loam to loamy fine sand; weak, fine, granular structure to massive; 5 to 20 percent platy and blocky gravel, cobbles, and stones by volume; nonsticky, nonplastic; pH 6.5 to 7.2; 6 to 15 inches thick.
Subsoil Layers:	Reddish brown to dark brown loam to sandy loam; massive to weak, medium, blocky structure; 20 to 60 percent platy and blocky cobbles and stones by volume; slightly sticky, slightly plastic; pH 6.5 to 7.2; 10 to 30 inches thick.

MAPPING UNIT 7T - Sage-Bunchgrass Ridgetops

Mapping Unit 7T consists of 70 percent or more of Landtype 7T and may have inclusions of Landtypes 7H, 91, and 53.

Landtype 7T is a miscellaneous landtype that occurs along narrow ridgetops. Soils are shallow and stony. They are typically loams or sandy loams. Vegetation includes sagebrush, buckwheat, Idaho fescue, and some bluebunch wheatgrass. Bedrock consists of platy to blocky andesites and basalts. Slopes range up to about 50 percent.



MAPPING UNIT 8A

Mapping Unit 8A consists of 70 percent or more of Landtype 8A and may have inclusions of Landtypes 8B, 69, 84, and 85.

Landtype 8A occurs on smooth to moderately dissected, steep side slopes of shield or composite volcanoes. Slope gradients are 30 to 70 percent. Elevation ranges from 5,800 to 6,500 feet, and the annual precipitation is about 40 to 70 inches.

Vegetation is composed of high elevation mixed conifers including Shasta red fir, white pine, lodgepole pine, mountain hemlock, and noble fir. The site potential for timber production is low.

This landtype has well to excessively drained soils formed from a moderately thick layer of pumice and volcanic ash over residuum and colluvium. Surface soils are typically pumiceous loamy sands, and buried soils are cobbly sandy loams. Permeability is very rapid in the surface soil and rapid to very rapid in the buried soil. Depth to bedrock is 30 to 80 inches.

Bedrock consists of black to dark gray, highly to moderately fractured, blocky basalts and andesites with inclusion of tuffs and breccias. Most of the material is hard and competent.

Landtype 8A is similar to Landtype 84 except it usually occurs at slightly lower elevations and has higher site potential. Landtype 9B is similar but has a thicker and coarser textured pumice soil layer. Landtype 8B is similar but occurs on more gentle slopes.

Range of Soil Characteristics of Landtype 8A

Litter:	Needles, twigs, cones, and decomposing organic matter often forming a tight mat; 1 to 3 inches thick.
Surface Layers:	Dark brown to gray, loamy sand to sandy loam; weak, fine, crumb structure; 0 to 15 percent pumice fragments; nonsticky, nonplastic; pH 5.5 to 6.0; 2 to 4 inches thick.
Sub-surface Layers:	Brown to yellowish brown pumiceous loamy sand; single grain; 5 to 30 percent pumice and blocky gravels, cobbles, and stones by volume; nonsticky, nonplastic; pH 5.5 to 6.8; 18 to 36 inches thick.
Buried Soil:	Very dark grayish brown to yellowish brown sandy loam to loamy sand; single grain to massive; 20 to 50 percent blocky gravels, cobbles, and stones by volume; nonsticky, nonplastic; pH 6.4 to 7.0; 10 to 40 inches thick.

MAPPING UNIT 8B

Mapping Unit 8B consists of 70 percent or more of Landtype 8B and may have inclusions of Landtypes 8A, 85, and 16.

Landtype 8B occurs on lava plains, benches, and toeslopes of shield or composite volcanoes. Slopes are smooth to uneven, with gradients of 0 to 30 percent. Elevation ranges from 5,500 to 6,200 feet, and the annual precipitation is about 40 to 70 inches.

Vegetation is composed of high elevation mixed conifers including Shasta red fir, white pine, lodgepole pine, mountain hemlock, and noble fir. The site potential for timber production is low.

This landtype has well drained soils formed from a moderately thick layer of pumice and volcanic ash over an older soil on complex volcanic materials. Surface soils are typically pumiceous loamy sands, and buried soils are sandy loams. Permeability is very rapid in the surface soils and rapid to very rapid in the buried soil. A nonwettable zone is often present at the surface. Depth to bedrock is 30 to 80 inches.

Bedrock is composed dominantly of hard basalts and andesites, and has inclusions of tuffs, breccias, and cinders. Materials range from competent to incompetent. They are highly fractured to slightly fractured.

Landtype 8B is similar to Landtype 85, but generally occurs at slightly lower elevations and has different vegetation. It is similar to Landtype 8A except the slopes are not as steep. Landtype 9W is somewhat similar, but has a thicker and coarser textured pumice mantle.

Range of Soil Characteristics of Landtype 8B

Litter:	Needles, twigs, cones, and decomposing organic matter often forming a tight mat; 1 to 3 inches thick.
Surface Layers:	Dark brown to gray loamy sand to sandy loam; weak, fine, crumb structure; 0 to 15 percent pumice fragments; nonsticky, nonplastic; pH 5.5 to 6.0; 2 to 4 inches thick.
Subsurface Layers:	Gray to strong brown pumiceous loamy sand to sand; massive to single grain; 5 to 30 percent pumice coarse fragments and blocky gravels, cobbles, and stones by volume; nonsticky, nonplastic; pH 5.5 to 6.8; 18 to 36 inches thick.
Buried Soil:	Brown to yellowish brown sandy loam to loamy sand; massive; 20 to 60 percent blocky gravels, cobbles, and stones by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.4 to 7.0; 0 to 40 inches thick.

MAPPING UNIT 8C - Exposed Caldera Walls at High Elevations

Mapping Unit 8C consists of 70 percent or more of Landtype 8C and may have inclusions of Landtypes 9, 8A, 8B, and 84.

Landtype 8C is a miscellaneous landtype that occurs on steep, slightly to moderately dissected side slopes of the caldera of a volcano. The aspect is mostly southerly and slope gradients are 30 to 80 percent. Elevation ranges from 6,300 to 7,500 feet, and the annual precipitation is about 30 to 40 inches. Vegetation consists of true firs, mountain hemlock, lodgepole pine, and a few ponderosa pine. The site is noncommercial for timber production.

The soils are composed of thin to thick deposits of volcanic ash, pumice, and cinders. The underlying materials are complex volcanic materials including lavas, pumice, cinders, tuffs, and breccias.



MAPPING UNIT 8E - Highly Eroded Sites

Mapping Unit 8E consists of 70 percent or more of Landtype 8E and may have inclusions of other landtypes.

Landtype 8E consists of highly dissected steep slopes and draws in the Upper Forest. These are eroded and gullied lands usually having a coarse-textured pumice soil which overlies soft or loose pyroclastic rocks. Vegetation consists of sparse lodgepole pine and mountain hemlock. This landtype occurs along the upper northeast slopes of the Paulina Mountains.

Slopes are 20 to 70 percent.



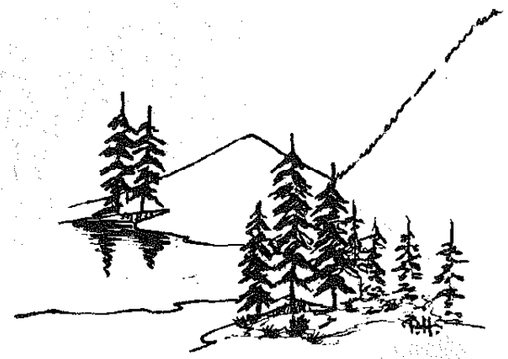
MAPPING UNIT 8P - Cinder Cones with Very Coarse Pumice at High Elevations

Mapping Unit 8P consists of 70 percent or more of Landtype 8P and may have inclusions of Landtypes 9, 83, and 84.

Landtype 8P is a miscellaneous landtype that occurs on cinder cones at high elevation. Slopes are steep, smooth to slightly dissected, and have a gradient of 25 to 65 percent. Elevation ranges from 5,800 to 7,500 feet, and the annual precipitation is about 30 to 70 inches. Vegetation consists dominantly of mountain hemlock, and the site is considered noncommercial for timber production.

The soils consist of a very coarse pumice mantel varying from about 60 to 200 inches thick over cinders. Most of the pumice material is between ½ and 3 inches in diameter.

Landtype 8P is similar to Landtype 83 except it has a pumice mantle that is thicker and coarser textured.



MAPPING UNIT 8T - Tuff Rings and Cones

Mapping Unit 8T consists of 70 percent or more of Landtype 8T and may have inclusions of other landtypes.

Landtype 8T occurs on tuff rings or cones composed mostly of tuffs and breccias supporting low site timber. Soils are very shallow to moderately deep. They are derived from coarse-textured pumice and volcanic ash. Vegetation is mostly lodgepole pine and mountain hemlock at high elevations, and ponderosa pine and juniper at the lower elevations. Slopes are 20 to 70 percent and have a radial drainage pattern. This unit is similar to Landtype 5A, but occurs on cones instead of linear ridges.



MAPPING UNIT 9A

Mapping Unit 9A consists of 70 percent or more of Landtype 9A and may have inclusions of Landtypes 9B, 9N, 9Z, 69, and 98.

Landtype 9A occurs on steep, moderately dissected slopes of buttes. Aspects are generally northerly and slope gradients are 30 to 70 percent. Elevation ranges from 4,500 to 6,000 feet, and the annual precipitation is estimated at 30 to 40 inches.

Vegetation is composed of mixed conifers including ponderosa pine, white fir, Douglas-fir, Shasta red fir, and lodgepole pine. Snowbrush and chinquapin are common shrubs. Productivity is estimated at cubic foot Site Class 4 to 5 and Site Index 80 to 100 for ponderosa pine. Site Index is 45 to 55 for white fir at Site Class 4.

This landtype has well to excessively drained soils formed from a thick layer of pumice and volcanic ash over residuum and colluvium. Surface soils are typically pumiceous loamy coarse sands, and subsoils are pumiceous coarse sands. Buried soils are sandy loams and loams. Permeability is very rapid in the pumice and ash layers and rapid in the buried soil. Depth to bedrock is 50 to 100 inches.

Bedrock consists primarily of hard basalts and andesites with inclusions of tuffs and breccias. It is commonly highly to moderately fractured.

Landtype 9A is similar to Landtype 9Z except for the degree of slope dissection. It is similar to Landtype 98 but occurs on steeper slopes. Landtype 9E is similar except it occurs on south aspects and has different vegetation.

Range of Soil Characteristics of Landtype 9A

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 3 inches thick.
Surface Layers:	Dark brown to brown pumiceous loamy coarse sand; weak, fine, crumb structure to single grain or massive; 10 to 40 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.0 to 6.8; 10 to 15 inches thick.
Subsoil Layers:	Yellowish brown to brownish yellow pumiceous coarse sand; single grain; 30 to 60 percent pumice coarse fragments by volume; pH 6.5 to 7.0; 15 to 30 inches thick.
	Pale brown to light brownish gray pumiceous coarse sand; single grain; 2 to 10 percent pumice coarse fragments; pH 6.5 to 7.0; 8 to 20 inches thick.
Buried Soil:	Dark brown to dark reddish brown cobbly sandy loam to loam; massive; 20 to 60 percent blocky cobbles, stones, and gravel by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.2 to 6.8; 6 to 60 inches thick.

MAPPING UNIT 9B

Mapping Unit 9B consists of 70 percent or more of Landtype 9B and may have inclusions of Landtypes 9Z, 8A, 8B, 83, and 84.

Landtype 9B occurs on steep, smooth to slightly dissected, side slopes and tops of shield volcanoes, composite cones, and lava domes. Slope gradients are 30 to 70 percent. Elevation ranges from 5,700 to 6,500 feet, and the annual precipitation is estimated at 35 to 45 inches.

Vegetation includes lodgepole pine, true firs, mountain hemlock, and white pine. Ground cover is usually sparce but may include some snowbrush, pinemat manzanita, princess pine, and sedges. This landtype has low potential for timber production.

This landtype has well to excessively drained soils formed from a thick to very thick layer of pumice and volcanic ash over residuum and colluvium. The surface soils are typically pumiceous loamy sands, and the subsoils are pumiceous sands. Buried soils are cobbly sandy loams to loams. Permeability is very rapid in the pumice and ash layers and rapid in the buried soil. Depth to bedrock is 50 to 120 inches.

Bedrock is composed of highly to moderately fractured basalts and andesites with inclusions of other volcanic rocks.

Landtype 9B is similar to Landtype 9A but occurs at higher elevations and has different vegetation. Landtypes 8A and 84 are similar but have a thinner pumice ash mantle.

Range of Soil Characteristics of Landtype 9B

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 3 inches thick, often forming a tight mat.
Surface Layers:	Brownish gray to dark brown pumiceous loamy sand; massive to single grain; 10 to 40 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 5.5 to 6.5; 8 to 12 inches thick.
Subsoil Layers:	Strong brown to yellowish brown pumiceous coarse sand; single grain; 30 to 60 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.5 to 7.0; 15 to 30 inches thick.
	Pale brown to light brownish gray pumiceous coarse sand; single grain; 2 to 10 percent pumice coarse fragments; pH 6.5 to 7.0; 8 to 20 inches thick.
Buried Soil:	Dark brown to dark reddish brown cobbly loamy sand to loam; gravel by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.2 to 6.8; 6 to 60 inches thick.

MAPPING UNIT 9C

Mapping Unit 9C consists of 70 percent or more of Landtype 9C and may have inclusions of Landtypes 9E, 9Z, 14, 68, and 97.

Landtype 9C occurs on steep, smooth to slightly dissected side slopes of buttes and ridges. Slope gradients are 30 to 70 percent and aspects are generally southerly. Elevation ranges from 4,400 to 5,800 feet, and the annual precipitation ranges from about 20 to 35 inches.

Vegetation is typically ponderosa pine, manzanita, bitterbrush, and sedges. Some snowbrush, white fir, lodgepole pine, and sugar pine may be included at the upper elevational range. Productivity is estimated at cubic foot Site Class 4 to 5 and Site Index 70 to 90 for ponderosa pine.

This landtype has excessively drained soils formed from a thick layer of pumice and volcanic ash over residuum and colluvium. Surface soils are typically pumiceous loamy sands, and subsoils are pumiceous coarse sands. Buried soils are generally sandy loams. Permeability is very rapid in the pumice and ash layers and rapid in the buried soil. Depth to bedrock is 50 to 120 inches.

Bedrock is composed of hard, highly to moderately fractured basalts and andesites with inclusions of other volcanic materials.

Landtype 9C is similar to Landtype 68 except it has a thicker pumice mantle. Landtype 9E is similar except the slopes are more dissected. Landtype 9R is similar to Landtype 9C except it has a thicker pumice mantle than Landtype 9C.

Range of Soil Characteristics of Landtype 9C

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 2.5 inches thick.
Surface Layers:	Dark brown to brown pumiceous loamy coarse sand; weak, fine, crumb structure to single grain or massive; 10 to 40 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.0 to 6.8; 10 to 15 inches thick.
Subsoil Layers:	Yellowish brown to brownish yellow pumiceous coarse sand; single grain; 30 to 60 percent pumice coarse fragments by volume; pH 6.5 to 7.0; 15 to 30 inches thick.
	Pale brown to light brownish gray pumiceous coarse sand; single grain; 2 to 10 percent pumice coarse fragments; pH 6.5 to 7.0; 8 to 20 inches thick.
Buried Soil:	Dark brown to dark reddish brown cobbly sandy loam to loam; massive; 20 to 60 percent blocky cobbles, stones, and gravel by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.2 to 6.8; 6 to 60 inches thick.

MAPPING UNIT 9F

Mapping Unit 9F consists of 70 percent or more of Landtype 9F and may have inclusions of Landtypes 41, 96, 97, and 9H.

Landtype 9F occurs on gently sloping glacial outwash and till plains. Slope gradients are 0 to 30 percent, most areas of which are less than 15 percent. Elevation ranges from 4,400 to 5,000 feet, and the annual precipitation is about 20 to 25 inches.

Vegetation is composed of ponderosa pine, lodgepole pine, manzanita, bitterbrush, some snowbrush, squirreltail, needlegrass, and sedges. Productivity is estimated at cubic foot Site Class 4 to 5 and Site Index 70 to 90 for ponderosa pine.

This landtype has excessively drained soils formed from a thick layer of pumice and volcanic ash over glacial outwash or glacial till. Surface soils are typically pumiceous loamy sands, and subsoils are pumiceous coarse sands. Buried soils are gravelly to cobbly sandy loams. Permeability is very rapid in the pumice and rapid in the buried soil.

Landtype 9F is similar to Landtype 97 except for underlying materials. It is similar to Landtype 9G only it occurs at higher elevations and has different vegetation. Landtype 9H is similar except it occurs on steeper slopes.

Range of Soil Characteristics of Landtype 9F

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 2 inches thick.
Surface Layers:	Dark brown to brown pumiceous loamy sand to loamy coarse sand; weak, fine, crumb structure to single grain or massive; 10 to 40 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.2 to 6.8; 8 to 15 inches thick.
Subsoil Layers:	Brownish yellow to pale brown pumiceous sand to sandy pumice; single grain; 30 to 60 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.7 to 7.0; 15 to 30 inches thick.
	Light yellowish brown to olive brown pumiceous sand; single grain; 2 to 10 percent pumice coarse fragments; pH 6.8 to 7.0; 8 to 20 inches thick.
Buried Soil:	Dark brown to brown sandy loam to loam; massive; 20 to 40 percent rounded and subrounded gravels and cobbles by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.4 to 6.8; 6 to 24 inches thick over very gravelly outwash or very cobbly glacial till.

MAPPING UNIT 9G

Mapping Unit 9G consists of 70 percent or more of Landtype 9G and may have inclusions of Landtypes 2B, 9F, 9J, 25, 98.

Landtype 9G occurs on gentle to moderately steep ground moraines. Slopes are smooth, single to complex, and have a gradient of 0 to 30 percent. Elevation ranges from 4,600 to 5,300 feet, and the annual precipitation is about 30 to 40 inches.

Vegetation is composed of mixed conifers including Douglas-fir, Shasta red fir, ponderosa pine, lodgepole pine, and white fir over snowbrush, chinquapin, manzanita, sedges, and a few grasses and forbs. Productivity is estimated at cubic foot Site Class 4 to 5 and Site Index 75 to 100 for ponderosa pine. Site Index is 45 to 50 for white fir at Site Class 4.

This landtype has well to excessively drained soils formed from a thick layer of pumice and volcanic ash over an older soil on glacial till. Surface soils are typically pumiceous loamy coarse sands, and subsoils are pumiceous sands and sandy pumice. Buried soils are sandy loams. Permeability is very rapid in the pumice and ash layers and rapid to moderate in the subsoil. In the unweathered glacial till, the material is often compact and has slow to moderate permeability.

Landtype 9G is similar to Landtype 98 except for underlying materials. It is similar to Landtype 9F but occurs at higher elevations and has different vegetation. Landtype 9J is similar, but occurs on steeper slopes. Landtype 25 is similar except the pumice mantle is thinner.

Range of Soil Characteristics of Landtype 9G

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 3 inches thick.
Surface Layers:	Very dark grayish brown to brown pumiceous loamy coarse sand; weak, fine, crumb structure to massive or single grain; 10 to 40 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.0 to 6.8; 10 to 15 inches thick.
Subsoil Layers:	Yellowish brown to brownish yellow pumiceous coarse sand; single grain; 30 to 60 percent pumice coarse fragments by volume; pH 6.5 to 7.0; 15 to 30 inches thick.
	Pale brown to light brownish gray pumiceous coarse sand; single grain; 2 to 10 percent pumice coarse fragments by volume; pH 6.8 to 7.0; 8 to 20 inches thick.
Buried Soils:	Dark brown to brown sandy loam to loam; massive; 15 to 50 percent subrounded cobbles, stones, and gravel by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.2 to 6.8; 10 to 20 inches thick over grayish colored glacial till.

MAPPING UNIT 9J

Mapping Unit 9J consists of 70 percent or more of Landtype 9J and may have inclusions of Landtypes 9G, 9H, 9N, 9Z, and 25.

Landtype 9J occurs on steep, smooth to slightly dissected side slopes of glacial moraines. Slope gradients are 30 to 60 percent. Elevation ranges from 4,600 to 5,400 feet, and the annual precipitation is about 30 to 45 inches.

Vegetation is composed of mixed conifers including Douglas-fir, Shasta red fir, ponderosa pine, white fir, white pine, and lodgepole pine over chinquapin and snowbrush. Productivity is estimated at cubic foot Site Class 4 to 5, and Site Index 75 to 95 for ponderosa pine and 45 to 55 for white fir.

This landtype has well to excessively drained soils formed from a thick layer of pumice and volcanic ash over an older soil on glacial till. Surface soils are typically pumiceous loamy coarse sands, and subsoils are pumiceous sands and sandy pumice. Buried soils are sandy loams or loams.

Landtype 9J is similar to Landtype 9Z except the underlying material is different. It is similar to Landtype 9N except for the thickness of the pumice mantle. Landtype 9G is similar but occurs on more gentle slopes.

Range of Soil Characteristics of Landtype 9J

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 3 inches thick.
Surface Layers:	Very dark grayish brown to brown pumiceous loamy coarse sand; weak, fine, crumb structure to massive or single grain; 10 to 40 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.0 to 6.8; 10 to 15 inches thick.
Subsoil Layers:	Yellowish brown to brownish yellow pumiceous coarse sand; single grain; 30 to 60 percent pumice coarse fragments by volume; pH 6.5 to 7.0; 15 to 30 inches thick. Pale brown to light brownish gray pumiceous coarse sand; single grain; 2 to 10 percent pumice coarse fragments by volume; pH 6.8 to 7.0; 8 to 20 inches thick.
Buried Soils:	Dark brown to brown sandy loam to loam; massive; 15 to 50 percent subrounded cobbles, stones, and gravel by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.2 to 6.8; 10 to 20 inches thick over grayish colored glacial till.

MAPPING UNIT 9K

Mapping Unit 9K consists of 70 percent or more of Landtype 9K and may have inclusions of Landtypes 2B, 9W, 8P, 7G, and 85.

Landtype 9K occurs on smooth, gentle to moderately sloping lands at high elevations including broad ridgetops, benches, lava plains, and till plains. Slope gradients are 0 to 30 percent. Elevation ranges from 5,800 to 7,000 feet. The annual precipitation is from about 35 to 60 inches.

Vegetation is composed of lodgepole pine and mountain hemlock. Ground cover is sparse and consists mostly of pinemat manzanita, sedges, and needlegrass. Site quality is very low for timber production.

This landtype has well to excessively drained soils formed from a thick to very thick (40 to 120 inches) coarse pumice mantle over undifferentiated materials. Surface soils are typically pumiceous loamy sands, and subsoils are sandy pumice to pumice lapilli. Permeability is very rapid.

The substrata consists of undifferentiated volcanic rocks or glacial till. In general, this landtype is underlain by volcanic rocks on the Fort Rock District, and glacial till on the Crescent District.

Landtype 9K is similar to Landtype 85, but has thicker, coarser textured pumice soils and generally supports more lodgepole pine. Landtype 9W is similar, but typically occurs at lower elevations and is a better site. Landtype 2A is somewhat similar, but the coarse pumice surface layer is thinner.

Range of Soil Characteristics of Landtype 9K

Litter:	Needles, twigs, cones, and decomposing organic matter; 0.5 to 2 inches thick.
Surface Layers:	Grayish brown to brown pumiceous loamy coarse sand; weak, fine, crumb structure to single grain; 30 to 50 percent pumice coarse fragments up to 2 inches in diameter; nonsticky, nonplastic; pH 5.5 to 6.5; 4 to 10 inches thick.
Subsoil Layers:	Light gray to reddish yellow sandy pumice; single grain; 50 to 90 percent pumice coarse fragments up to 3 inches in diameter; pH 6.0 to 7.0; 24 to 50 inches thick for Mazama pumice; up to 20 feet thick for Newberry pumice. Pale brown to light gray sandy pumice to pumiceous sand; single grain; 20 to 50 percent pumice fragments up to about ½-inch in diameter; pH 6.5 to 7.0; 18 to 60 inches thick for Mazama pumice; not present in Newberry pumice.
Buried Soil:	Dark brown to yellowish brown loamy sand to loam; massive; 10 to 70 percent blocky to subrounded cobbles, stones, and gravel by volume; nonsticky to sticky, nonplastic to plastic; pH 6.4 to 6.8; 0 to 30 inches thick over glacial till or volcanic bedrock materials.

MAPPING UNIT 9L

Mapping Unit 9L consists of 70 percent or more of Landtype 9L and may have inclusions of Landtypes 9F, 9M, 9R, and 97.

Landtype 9L occurs on gentle to moderately sloping lava plains, till plains, or outwash plains. Slope gradients are 0 to 30 percent. Elevation ranges from 4,500 to 5,500 feet, and the annual precipitation is about 20 to 25 inches.

Vegetation is composed dominantly of ponderosa pine, lodgepole pine, bitterbrush, manzanita, needlegrass, squirreltail, and sedges. Productivity is estimated at cubic foot Site Class 5 and Site Index 65 to 80 for ponderosa pine.

This landtype has excessively drained soils derived from a very thick (greater than 60 inches) pumice mantle over older soils on glacial deposits or lavas. Surface soils are typically pumiceous loamy coarse sands and subsoils are sandy pumice and pumice lapilli. Buried soils are generally cobbly sandy loams. Permeability is very rapid in the pumice and ash layers and rapid in the buried soil.

The substrata consists of undifferentiated volcanic rocks or glacial till.

Landtype 9L is similar to Landtypes 97 and 9F except it has a thicker and coarser textured pumice mantle. Landtype 97 is somewhat similar but occurs on more gentle slopes and lacks ponderosa pine.

Range of Soil Characteristics of Landtype 9L

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0.5 to 2 inches thick.
Surface Layers:	Very dark grayish brown to brown pumiceous loamy sand to loamy coarse sand; weak, fine, crumb structure to single grain; 20 to 40 percent pumice coarse fragments up to about two inches in diameter; nonsticky, nonplastic; pH 6.0 to 6.8; 8 to 15 inches thick.
Subsoil Layers:	Brownish yellow to yellowish red pumiceous coarse sand; single grain; 50 to 90 percent pumice coarse fragments up to three inches in diameter; pH 6.8 to 7.0; 20 to 30 inches thick.
	Pale brown to light gray pumiceous coarse sand; single grain; 10 to 50 percent pumice coarse fragments up to about one inch in diameter; pH 6.8 to 7.0; 20 to 80 inches thick.
Buried Soil:	Dark brown to brown cobbly sandy loam to loam; massive; 20 to 60 percent blocky or subrounded cobbles, stones, and gravels by volume; nonsticky to slightly sticky; nonplastic to slightly plastic; pH 6.4 to 6.8; 0 to 30 inches thick over glacial till or volcanic bedrock materials.

MAPPING UNIT 9M

Mapping Unit 9M consists of 70 percent or more of Landtype 9M and may have inclusions of Landtypes 9L, 9N, 2B, and 43.

Landtype 9M occurs on gentle to moderately steep, smooth to uneven uplands underlain by lavas or glacial till. Slope gradients are 0 to 30 percent. Elevation ranges from 4,500 to 6,000 feet, and the annual precipitation is about 25 to 40 inches.

Vegetation is composed of mixed conifers including ponderosa pine, white fir, Douglas-fir, sugar pine, Shasta red fir, white pine, and lodgepole pine. The Shasta fir and white fir are near the upper elevational limits. Common shrubs are chinquapin, snowbrush, and manzanita. Productivity is estimated at cubic foot Site Class 4 to 5 and Site Index 75 to 95 for ponderosa pine and 45 to 55 for white fir.

This landtype has well to excessively drained soils derived from a very thick pumice and ash layer over an older soil on glacial till or lavas. Surface soils are typically pumiceous loamy sands, and subsoils are pumiceous coarse sand. Buried soils are generally cobbly sandy loams.

The substrata consists of undifferentiated volcanic rocks or glacial till.

Landtype 9M is similar to Landtypes 98 and 9G except the pumice mantle is thicker and coarser textured. It is similar to 9L, but usually occurs at higher elevations and has different vegetation. Landtype 9N is similar, but has steeper slopes.

Range of Soil Characteristics of Landtype 9M

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 3 inches thick.
Surface Layers:	Very dark grayish brown to brown pumiceous loamy sand to loamy coarse sand; weak, fine, crumb structure to single grain; 20 to 40 percent pumice coarse fragments up to about two inches in diameter; nonsticky, nonplastic; pH 6.0 to 6.8; 8 to 15 inches thick.
Subsoil Layers:	Brownish yellow to yellowish red pumiceous coarse sand; single grain; 50 to 90 percent pumice coarse fragments up to three inches in diameter; pH 6.8 to 7.0; 20 to 30 inches thick.
	Pale brown to light gray pumiceous coarse sand; single grain; 10 to 50 percent pumice coarse fragments up to about one inch in diameter; pH 6.8 to 7.0; 20 to 80 inches thick.
Buried Soil:	Dark brown to brown cobbly sandy loam to loam; massive; 20 to 60 percent blocky or subrounded cobbles, stones, and gravels by volume; nonsticky to slightly sticky; nonplastic to slightly plastic; pH 6.4 to 6.8; 0 to 30 inches thick over glacial till or volcanic bedrock materials.

MAPPING UNIT 9N

Mapping Unit 9N consists of 70 percent or more of Landtype 9N and may have inclusions of Landtypes 9M, 9Z, 9J, 9P, and 9R.

Landtype 9N occurs on steeply sloping, smooth to slightly dissected slopes along lava ridges, moraines, glacial valley walls, or escarpments. Slope gradients are 30 to 70 percent. Elevation ranges from 4,500 to 6,000 feet, and the annual precipitation is estimated at 30 to 45 inches.

Vegetation is composed of mixed conifers including ponderosa pine, white fir, Douglas-fir, Shasta red fir, lodgepole pine, sugar pine, and white pine. Common shrubs are chinquapin, snowbrush, and manzanita. Productivity is estimated at cubic foot Site Class 4 to 5 and Site Index 75 to 95 for ponderosa pine and 45 to 55 for white fir.

This landtype has well to excessively drained soils formed from a very thick layer (greater than 60 inches) of pumice and volcanic ash over older soils on glacial till, volcanic rocks, and colluvium. Surface soils are typically pumiceous loamy sands, and subsoils are pumiceous coarse sands. The buried soils are usually cobbly sandy loams.

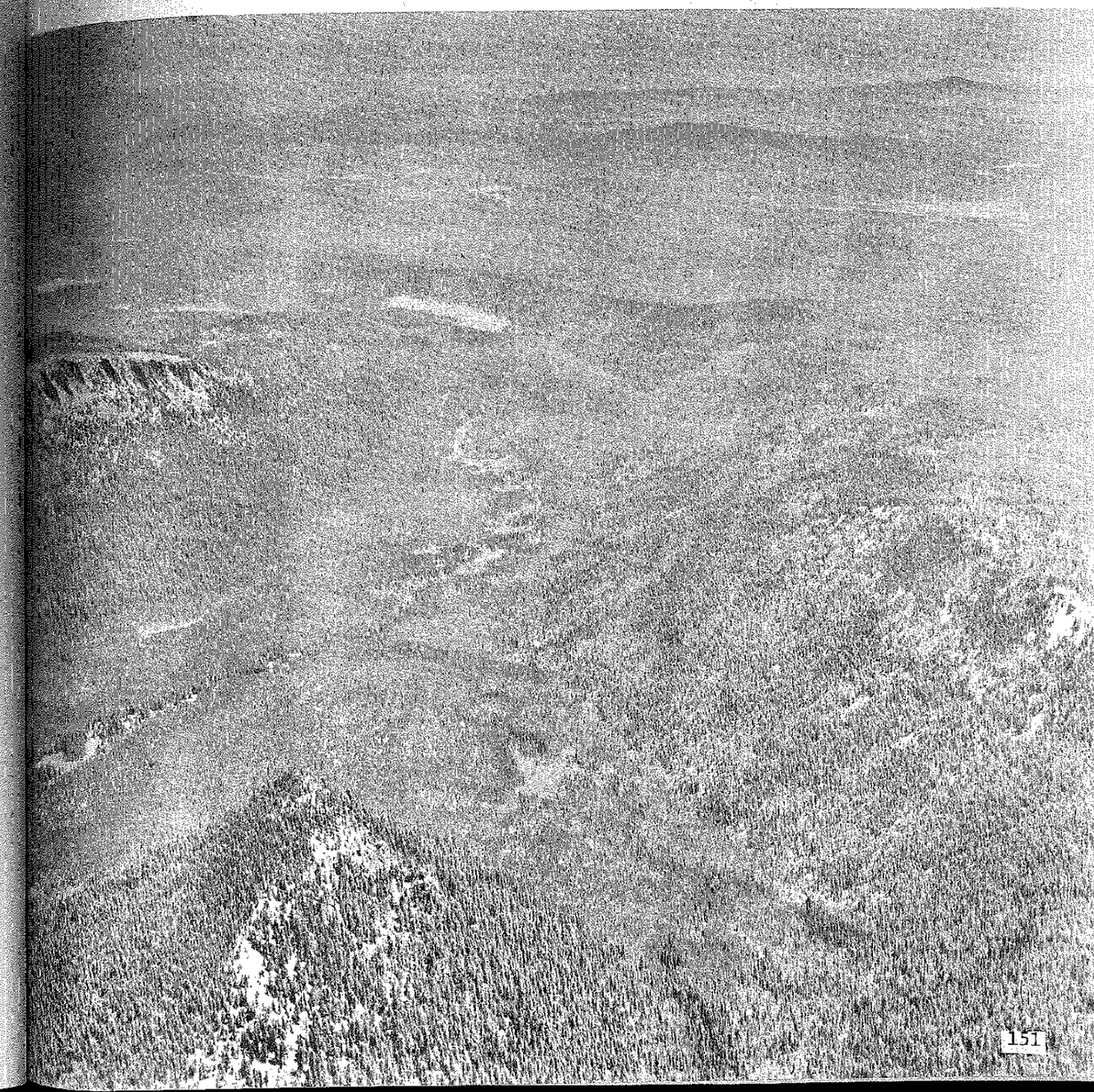
The substrata consists of undifferentiated volcanic rocks or glacial till.

Landtype 9N is similar to Landtypes 9J and 9Z except it has a thicker and coarser pumice mantle. Landtype 9R is similar, but has different vegetation. Landtype 9M is similar to Landtype 9N except slopes are not as steep.

Range of Soil Characteristics of Landtype 9N

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 3 inches thick.
Surface Layers:	Very dark grayish brown to brown pumiceous loamy sand to loamy coarse sand; weak, fine, crumb structure to single grain; 20 to 40 percent pumice coarse fragments up to about two inches in diameter; nonsticky, nonplastic; pH 6.0 to 6.8; 8 to 15 inches thick.
Subsoil Layers:	Brownish yellow to yellowish red pumiceous coarse sand; single grain; 50 to 90 percent pumice coarse fragments up to three inches in diameter; pH 6.8 to 7.0; 20 to 30 inches thick.
	Pale brown to light gray pumiceous coarse sand; single grain; 10 to 50 percent pumice coarse fragments up to about one inch in diameter; pH 6.8 to 7.0; 20 to 80 inches thick.
Buried Soil:	Dark brown to reddish brown cobbly sandy loam to loam; massive; 20 to 60 percent blocky or subrounded cobbles, stones, boulders, and gravels by volume; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.4 to 6.8; 0 to 60 inches thick over volcanic rocks or glacial till.

Figure10. The Upper Little Deschutes River drainage, in the southwest corner of the Forest, is an example of a glacial valley in the High Cascades Physiographic Province. The view is looking northeasterly over Clover Butte and toward Walker Rim which is a fault escarpment at the edge of the Basin and Range Physiographic Province. Coarse-textured pumice soils are present in this area.



MAPPING UNIT 9P

Mapping Unit 9P consists of 70 percent or more of Landtype 9P and may have inclusions of Landtypes 9M, 9N, 9Z, 84, and 2.

Landtype 9P occurs on steep, moderately dissected slopes primarily along glacial valley walls. Slope gradients are 30 to 70 percent. Elevation ranges from 4,500 to 6,000 feet, and the annual precipitation is about 40 to 65 inches.

Vegetation is composed of Douglas-fir, white fir, Shasta red fir, and white pine with some mountain hemlock at the upper elevation limits. The landtype has low potential for timber management due to the steep slopes and sensitive soils, although some sites may be quite productive.

This landtype has well to excessively drained soils derived from a very thick pumice layer over residuum and colluvium. Surface soils are typically pumiceous loamy coarse sands, and subsoils are pumiceous coarse sands and pumice lapilli. Buried soils are stony sandy loams. Permeability is very rapid in the pumice and ash layers and moderate to rapid in the buried soils.

The substrata consists of undifferentiated volcanic rocks and glacial till.

Landtype 9P is similar to Landtype 9N, but has moderately dissected slopes and generally occurs at higher elevations. Landtype 84 is somewhat similar, but occurs at higher elevations and the pumice mantle is thinner. Landtype 9A is also similar except it has a thinner pumice mantle.

Range of Soil Characteristics of Landtype 9P

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1.5 to 3 inches thick.
Surface Layers:	Brownish gray to brown pumiceous loamy sand to loamy coarse sand; weak, fine, crumb structure to massive or single grain; 20 to 40 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.0 to 6.5; 7 to 15 inches thick.
Subsoil Layers:	Yellowish red to very pale brown pumiceous coarse sand; single grain; 50 to 90 percent pumice coarse fragments by volume; pH 6.7 to 7.0; 20 to 40 inches thick.
	Pale brown to light gray pumiceous coarse sand; single grain; 10 to 50 percent pumice coarse fragments; pH 6.8 to 7.0; 20 to 80 inches thick.
Buried Soil:	Dark brown to brown cobbly sandy loam to loam; massive; 20 to 60 percent subrounded to platy stones, boulders, cobbles, and gravel by volume; slightly sticky, slightly plastic; pH 6.4 to 6.8; 0 to 40 inches thick over glacial till or volcanic bedrock materials.

MAPPING UNIT 9R

Mapping Unit 9R consists of 70 percent or more of Landtype 9R and may have inclusions of Landtypes 9C, 9H, 9L, and 9N.

Landtype 9R occurs on steep, smooth to slightly dissected slopes along glacial valley walls, moraines, or volcanic ridges. Slope gradients are 30 to 70 percent and aspects are typically southerly. Elevation ranges from 4,400 to 5,600 feet, and the annual precipitation is estimated at 25 to 40 inches.

Vegetation is dominantly ponderosa pine, manzanita, bitterbrush, snowbrush, sedges, needlegrass, and a few forbs. Productivity is estimated at cubic foot Site Class 5 and Site Index 65 to 85 for ponderosa pine.

This landtype has excessively drained soils derived from a very thick layer of pumice and volcanic ash on residuum and colluvium. Surface soils are pumiceous loamy coarse sands, and subsoils are pumiceous coarse sands. Buried soils are typically cobbly sandy loams. Permeability is very rapid in the pumice and ash layers and rapid to moderate in the buried soils.

The substrata consists of undifferentiated volcanic rocks or glacial till.

Landtype 9R is similar to Landtypes 9C and 9H except the pumice mantle is thicker. It is similar to Landtype 9S except for the degree of slope dissection, and to 9N except for vegetation.

Range of Soil Characteristics of Landtype 9R

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0.5 to 2 inches thick.
Surface Layers:	Very dark grayish brown to brown pumiceous loamy sand to loamy coarse sand; weak, fine, crumb structure to single grain; 20 to 40 percent pumice coarse fragments up to about two inches in diameter; nonsticky, nonplastic; pH 6.0 to 6.8; 8 to 15 inches thick.
Subsoil Layers:	Brownish yellow to yellowish red pumiceous coarse sand; single grain; 50 to 90 percent pumice coarse fragments up to three inches in diameter; pH 6.8 to 7.0; 20 to 30 inches thick.
	Pale brown to light gray pumiceous coarse sand; single grain; 10 to 50 percent pumice coarse fragments up to about one inch in diameter; pH 6.8 to 7.0; 20 to 80 inches thick.
Buried Soil:	Dark brown to brown cobbly sandy loam to loam; massive; 20 to 60 percent blocky or subrounded cobbles, stones, and gravels by volume; nonsticky to slightly sticky; nonplastic to slightly plastic; pH 6.4 to 6.8; 0 to 30 inches thick over glacial till or volcanic bedrock materials.

MAPPING UNIT 9S

Mapping Unit 9S consists of 70 percent or more of Landtype 9S and may have inclusions of Landtypes 9C, 9H, 9L, and 9R.

Landtype 9S occurs on steep, moderately dissected slopes, with gradients of 30 to 70 percent. Aspects are typically southerly. Elevation ranges from 4,400 to 5,600 feet, and the annual precipitation is estimated at 20 to 30 inches.

Vegetation is composed dominantly of ponderosa pine over manzanita, bitterbrush, and some snowbrush. Sedges, needlegrass, and a few forbs are present in low quantities. Productivity is estimated at cubic foot Site Class 5 and Site Index 65 to 85 for ponderosa pine.

This landtype has excessively drained soils derived from a very thick pumice and volcanic ash layer over residuum and colluvium. Surface soils are typically pumiceous loamy coarse sands, and subsoils are pumiceous coarse sands. Buried soils are typically sandy loams. Permeability is very rapid in the pumice and ash layers and rapid to moderate in the buried soils.

The substrata consists of glacial deposits and undifferentiated volcanic bedrock materials.

Landtype 9S is similar to Landtype 9R except for the degree of slope dissection. It is similar to Landtype 9C, but the pumice mantle is thicker. Landtype 9L is similar except it occurs on more gentle slopes.

Range of Soil Characteristics of Landtype 9S

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0.5 to 2 inches thick.
Surface Layers:	Very dark grayish brown to brown pumiceous loamy sand to loamy coarse sand; weak, fine, crumb structure to single grain; 20 to 40 percent pumice coarse fragments up to about two inches in diameter; nonsticky, nonplastic; pH 6.0 to 6.8; 8 to 15 inches thick.
Subsoil Layers:	Brownish yellow to yellowish red pumiceous coarse sand; single grain; 50 to 90 percent pumice coarse fragments up to three inches in diameter; pH 6.8 to 7.0; 20 to 30 inches thick.
	Pale brown to light gray pumiceous coarse sand; single grain; 10 to 50 percent pumice coarse fragments up to about one inch in diameter; pH 6.8 to 7.0; 20 to 80 inches thick.
Buried Soil:	Dark brown to brown cobbly sandy loam to loam; massive; 20 to 60 percent blocky or subrounded cobbles, stones, and gravels by volume; nonsticky to slightly sticky; nonplastic to slightly plastic; pH 6.4 to 6.8; 0 to 30 inches thick over glacial till or volcanic bedrock materials.

MAPPING UNIT 9T

Mapping Unit 9T consists of 70 percent or more of Landtype 9T and may have inclusions of Landtypes 81, 82, 9R, and 9N.

Landtype 9T occurs on steep, smooth slopes of cinder cones. Slope gradients are 25 to 60 percent and aspects are variable. Elevation ranges from 5,000 to 5,500 feet, and the annual precipitation is about 20 to 35 inches.

Vegetation is quite variable in this landtype. It may range from a ponderosa pine, manzanita, bitterbrush type to mixed conifers over snowbrush and chinquapin. Productivity is estimated at cubic foot Site Class 4 to 5 and Site Index 65 to 90 for ponderosa pine.

This landtype has excessively drained soils derived from a very thick to thick layer of pumice and volcanic ash over a thin residuum on cinders and scoria. Surface soils are pumiceous loamy coarse sands, and subsoils are pumiceous coarse sands. Buried soils are typically cindery loamy sands. Permeability is very rapid in the pumice and ash layers and rapid to very rapid in the buried soil.

Landtype 9T is similar to Landtypes 81 and 82 except the pumice mantle is thicker and coarser textured. Landtypes 9R and 9N are similar except for underlying materials and landform.

Range of Soil Characteristics of Landtype 9T

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0.5 to 3 inches thick.
Surface Layers:	Very dark grayish brown to brown pumiceous loamy sand to loamy coarse sand; weak, fine, crumb structure to single grain; 20 to 40 percent pumice coarse fragments up to about two inches in diameter; nonsticky, nonplastic; pH 6.0 to 6.8; 8 to 15 inches thick.
Subsoil Layers:	Brownish yellow to yellowish red pumiceous coarse sand; single grain; 50 to 90 percent pumice coarse fragments up to three inches in diameter; pH 6.8 to 7.0; 15 to 30 inches thick.
	Pale brown to light gray pumiceous coarse sand; single grain; 10 to 50 percent pumice coarse fragments up to about one inch in diameter; pH 6.8 to 7.0; 15 to 80 inches thick.
Buried Soil:	Yellowish brown to reddish brown cindery loamy sand to sandy loam; massive; 10 to 60 percent cinder coarse fragments by volume; nonsticky, nonplastic; pH 6.5 to 7.0; 0 to 24 inches thick over cinders or scoria.

MAPPING UNIT 9U

Mapping Unit 9U consists of 70 percent or more of Landtype 9U and may have inclusions of Landtypes 9X, 9V, 15, 41, and 6B.

Landtype 9U occurs on smooth to uneven lava plains and outwash plains along the east slopes of the Paulina Mountains. Slope gradients are 0 to 30 percent. Elevation ranges from 5,000 to 5,800 feet, and the annual precipitation is about 18 to 25 inches.

Vegetation is composed of lodgepole pine and ponderosa pine over needlegrass, bitterbrush, squirreltail, currant, and sedges. Productivity is estimated at cubic foot Site Class 5 to 6 and Site Index 30 to 40 for lodgepole pine.

This landtype has excessively drained soils formed from a 1- to 6-foot layer of Newberry pumice overlying about 20 to 30 inches of Mazama ash and older soils formed from waterlain sands and gravels or basaltic lavas. The permeability is very rapid in the pumice layers and rapid to very rapid in the buried soils.

Landtype 9U is similar to Landtype 9V, but the landform is not as rough and rocky. It is somewhat similar to Landtypes 41 and 6B, but the soils are coarser textured and the site potential is lower.

Range of Soil Characteristics of Landtype 9U

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0 to 1.5 inches thick.
Surface Layers:	Grayish brown to brown pumiceous loamy coarse sand to pumiceous sand; single grain; 40 to 60 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.0 to 6.5; 4 to 10 inches thick.
Subsoil Layers:	Light gray to grayish brown pumice gravel; single grain; 80 to 98 percent pumice coarse fragments by volume, mostly ½ to 1 inch in diameter; pH 6.4 to 6.8; 8 to 60 inches thick. Yellowish brown pumiceous loamy sand; single grain to massive; 5 to 20 percent pumice and subrounded gravels by volume; nonsticky, nonplastic; pH 6.8 to 7.0; 18 to 30 inches thick.
Buried Soil:	Dark brown to brown sandy loam to loamy sand; single grain to massive; 10 to 40 percent subrounded gravels or blocky cobbles by volume; nonsticky, nonplastic; pH 6.4 to 6.8; 0 to 24 inches thick over outwash sands and gravels or basaltic lava.

MAPPING UNIT 9V

Mapping Unit 9V consists of 70 percent or more of Landtype 9V and may have inclusions of Landtypes 11, 15 7E, and 9U.

Landtype 9V occurs on rough, uneven lavaflow lands. Slope gradients are generally less than 30 percent, but there are some steep, short pitches due to the uneven nature of the landform. Rock outcrops are common. Elevation ranges from 5,200 to 5,800 feet, and the annual precipitation is about 18 to 25 inches.

Vegetation is composed of lodgepole pine and ponderosa pine over needlegrass, squirreltail, bitterbrush, and currant. This landtype has low potential for timber management due to the stoniness and poor soils.

This landtype has excessively drained soils formed from 1- to 6-feet of coarse Newberry pumice over rough lavas. Surface soils are pumiceous loamy sands, and subsoils are pumice lapilli. Permeability is very rapid.

Bedrock consists of black, highly to moderately fractured basaltic lavas. It is hard and competent.

Landtype 9V is similar to Landtype 9U, but the landform is much rougher and rockier. Landtypes 74, 76, and 77 are somewhat similar, but do not have the coarse pumice mantle and have different vegetation.

Range of Soil Characteristics of Landtype 9V

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 1 inch thick.
Surface Layers:	Grayish brown to brown pumiceous loamy coarse sand to sand; single grain; 40 to 60 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.0 to 6.5; 4 to 10 inches thick.
Subsoil Layers:	Light gray to grayish brown pumiceous coarse sand; single grain; 80 to 98 percent pumice coarse fragments (mostly ½ to 1 inch in diameter) by volume; pH 6.4 to 6.8; 8 to 70 inches thick. Brown to yellowish brown very cobbly loamy sand; single grain to massive; 40 to 70 percent blocky cobbles, stones, boulders, and gravel by volume; nonsticky, nonplastic; pH 6.8 to 7.0; 0 to 30 inches thick over basaltic lava bedrock.

MAPPING UNIT 9W

Mapping Unit 9W consists of 70 percent or more of Landtype 9W and may have inclusions of Landtypes 9K, 9M, 85, 84, 8B, and 2B.

Landtype 9W occurs on relatively gentle, smooth slopes on lava plains, till plains, and plateaus at high elevations. Slope gradients are 0 to 30 percent. Elevation ranges from 5,800 to 6,500 feet, and the annual precipitation ranges from about 30 to 50 inches.

Vegetation is composed of mountain hemlock, lodgepole pine, and true firs over currant, lupine, and sedges. Productivity is estimated at cubic foot Site Class 6 and Site Index 20 to 35 for lodgepole pine.

This landtype has well to excessively drained soils derived from a very thick pumice mantle on older soils over glacial till or volcanic bedrock materials. Surface soils are pumiceous loamy coarse sands, and subsoils are pumiceous sands. Buried soils are typically cobbly sandy loams.

The substrata consists of glacial till or undifferentiated volcanic bedrock materials.

Landtype 9W is similar to Landtype 9K except it usually occurs at lower elevations and is a slightly better site. It is similar to Landtype 8B, but has a thicker and coarser textured pumice mantle. Landtype 2B is somewhat similar, but occurs at lower elevations and generally does not support mountain hemlock.

Range of Soil Characteristics of Landtype 9W

Litter:	Needles, twigs, cones, and decomposing organic matter; 0.5 to 2 inches thick.
Surface Layers:	Grayish brown to brown pumiceous loamy coarse sand; weak, fine, crumb structure to single grain; 30 to 50 percent pumice coarse fragments up to 2 inches in diameter; nonsticky, nonplastic; pH 5.5 to 6.5; 4 to 10 inches thick.
Subsoil Layers:	Light gray to reddish yellow sandy pumice; single grain; 50 to 90 percent pumice coarse fragments up to 3 inches in diameter; pH 6.0 to 7.0; 24 to 50 inches thick for Mazama pumice; up to 20 feet thick for Newberry pumice. Pale brown to light gray sandy pumice to pumiceous sand; single grain; 20 to 50 percent pumice fragments up to about ½-inch in diameter; pH 6.5 to 7.0; 18 to 60 inches thick for Mazama pumice; not present in Newberry pumice.
Buried Soil:	Dark brown to yellowish brown loamy sand to loam; massive; 10 to 70 percent blocky to subrounded cobbles, stones, and gravel by volume; nonsticky to sticky, nonplastic to plastic; pH 6.4 to 6.8; 0 to 30 inches thick over glacial till or volcanic bedrock materials.

MAPPING UNIT 9X

Mapping Unit 9X consists of 70 percent or more of Landtype 9X and may have inclusions of Landtypes 9U and 69.

Landtype 9X occurs on moderately steep to steep, smooth to slightly dissected side slopes of lava ridges or old drainage dissections. Slope gradients range from 25 to 50 percent and aspects are generally northerly. Elevation ranges from 5,200 to 5,800 feet, and the annual precipitation is about 18 to 25 inches.

Vegetation includes lodgepole pine, white fir, and some ponderosa pine over low density currant, lupine, needlegrass, sedges, bitterbrush and squirreltail. Small amounts of snowbrush may be present. Productivity is estimated at cubic foot Site Class 5 to 6 and Site Index 30 to 40 for lodgepole pine.

This landtype has excessively to well drained soils derived from a 1- to 6-foot layer of coarse Newberry pumice over an older soil on outwash deposits or lavas. Surface soils are pumiceous loamy sands, and subsoils are pumiceous sands and coarse pumice. Buried soils are typically sandy loams. Permeability is very rapid in the pumice layers and rapid to very rapid in the buried soils.

The substrata consists of hard, basaltic lavas and outwash sands and gravels.

Landtype 9X is similar to Landtype 9U, but it occurs on steeper slopes. Landtype 7G is somewhat similar, but occurs at higher elevations and the vegetation is different.

Range of Soil Characteristics of Landtype 9X

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 0 to 1.5 inches thick.
Surface Layers:	Grayish brown to brown pumiceous loamy coarse sand to pumiceous sand; single grain; 40 to 60 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.0 to 6.5; 4 to 10 inches thick.
Subsoil Layers:	Light gray to grayish brown pumiceous coarse sand; single grain; 80 to 98 percent pumice coarse fragments by volume, mostly ½ to 1 inch in diameter; pH 6.4 to 6.8; 8 to 70 inches thick. Yellowish brown pumiceous loamy sand; single grain to massive; 5 to 20 percent pumice and subrounded gravels by volume; nonsticky, nonplastic; pH 6.8 to 7.0; 18 to 30 inches thick.
Buried Soil:	Dark brown to brown sandy loam to loamy sand; single grain to massive; 10 to 40 percent subrounded gravels or block cobbles by volume; nonsticky, nonplastic; pH 6.4 to 6.8; 0 to 24 inches thick over outwash sands and gravels or basaltic lava.

MAPPING UNIT 9Y

Mapping Unit 9Y consists of 70 percent or more of Landtype 9Y and may have inclusions of Landtypes 5, 12, 16, and 2B.

Landtype 9Y occurs on uneven glaciated lands at high elevations. Slopes are convex, complex, and have a gradient of 10 to 40 percent. Wet spots are common. Elevation ranges from 5,800 to 6,500 feet, and the annual precipitation is about 45 to 60 inches.

Vegetation is composed dominantly of mountain hemlock, true firs, and lodgepole pine over huckleberry and sedges. Site quality is low to very low for timber production.

This landtype has well drained soils formed from a thick to very thick layer of pumice and volcanic ash over glacial deposits. Surface soils are pumiceous loamy sands, and subsoils are pumiceous coarse sands. Buried soils are typically cobbly sandy loams.

Landtype 9Y is similar to Landtype 16 except it has a thicker and coarser textured pumice mantle. Landtype 9W is similar but occurs on smoother slopes and does not have the depressions with wet spots as are found in Landtype 9Y.

Range of Soil Characteristics of Landtype 9Y

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter which often forms a tight mat; 1 to 2.5 inches thick.
Surface Layers:	Gray to dark grayish brown or brown pumiceous loamy sand to loamy coarse sand; weak, fine, crumb structure to single grain; 20 to 40 percent pumice coarse fragments up to about 1½ inches in diameter; nonsticky, nonplastic; pH 5.5 to 6.5; 7 to 12 inches thick.
Subsoil Layers:	Yellowish red and light gray (mottled particles) pumiceous coarse sand; single grain; 70 to 95 percent pumice coarse fragments by volume; pH 6.0 to 7.0; 20 to 40 inches thick.
	Brownish yellow to pale yellow pumiceous coarse sand; single grain; 10 to 30 percent pumice coarse fragments up to about ½ inch in diameter; pH 6.2 to 7.0; 20 to 60 inches thick.
Buried Soil:	Dark yellowish brown to dark brown cobbly sandy loam to cobbly loamy sand; massive; 20 to 40 percent subrounded cobbles, stones, and gravel by volume; nonsticky to slightly sticky; nonplastic to slightly plastic; pH 6.0 to 6.5; 0 to 24 inches thick over compact glacial till.

MAPPING UNIT 9Z

Mapping Unit 9Z consists of 70 percent or more of Landtype 9Z and may have inclusions of Landtypes 9A, 9B, 9N, and 98.

Landtype 9Z occurs on steep, smooth to slightly dissected, single slopes on buttes. Aspects are generally northerly and slope gradients are 30 to 70 percent. Elevation ranges from 4,500 to 6,000 feet, and the annual precipitation is about 30 to 40 inches.

Vegetation is composed of mixed conifers including ponderosa pine, white fir, Douglas-fir, Shasta red fir, lodgepole pine, and sugar pine. Snowbrush and chinquapin are typical shrubs. Productivity is estimated at cubic foot Site Class 4 to 5, and Site Index 80 to 100 for ponderosa pine and 45 to 55 for white fir.

This landtype has well to excessively drained soils formed from a thick layer of pumice and volcanic ash over residuum and colluvium. Surface soils are typically pumiceous loamy sands, and subsoils are pumiceous coarse sands. Buried soils are cobbly sandy loams to loams. Permeability is very rapid in the pumice and ash mantle and rapid in the buried soil. Depth to bedrock is 50 to 100 inches.

Bedrock consists primarily of highly to moderately fractured basalts and andesites with inclusions of tuffs and breccias. It is dominantly hard and competent.

Landtype 9Z is similar to Landtype 98, but occurs on steeper slopes. It is similar to Landtype 9A except for the degree of slope dissection.

Range of Soil Characteristics of Landtype 9Z

Litter:	Needles, leaves, twigs, cones, and decomposing organic matter; 1 to 3 inches thick.
Surface Layers:	Dark brown to brown pumiceous loamy coarse sand; weak, fine, crumb structure to massive or single grain; 10 to 40 percent pumice coarse fragments by volume; nonsticky, nonplastic; pH 6.0 to 6.8; 10 to 15 inches thick.
Subsoil Layers:	Yellowish brown to brownish yellow pumiceous coarse sand; single grain; 30 to 60 percent pumice coarse fragments by volume; pH 6.5 to 7.0; 15 to 30 inches thick.
	Pale brown to light brownish gray pumiceous coarse sand; single grain; 2 to 10 percent pumice coarse fragments; pH 6.5 to 7.0; 8 to 20 inches thick.
Buried Soil:	Dark brown to dark reddish brown cobbly sandy loam to loam; massive; 20 to 60 percent blocky cobbles, stones, boulders, and gravels; nonsticky to slightly sticky, nonplastic to slightly plastic; pH 6.2 to 6.8; 6 to 60 inches thick.

MAPPING UNIT W

Mapping Unit W is used for lakes. On reservoirs, the delineation extends to the high waterline.

For Land Use Planning coding purposes, WL is used where W occurs on the SRI maps.



COMPLEX MAPPING UNITS

Mapping Unit No.	Landtype Components
GA	17, 73
GB	17, 19
GC	19, 2
GD	21, 22
GE	22, 24
GF	22, 25
GG	22, 28
GH	25, 32
GJ	25, 65
GK	25, 19
GL	28, 24
GM	29, 30
GN	29, 28
GP	37, 32
GR	37, 39
GS	37, 64
GT	37, 8
GU	41, 35
GV	42, 38
GX	28, 21, 22
HB	12, 5, 4
HC	12, 6, 4
HD	13, 12, 6
HE	13, 4
HF	13, 84
HG	16, 17
HJ	18, 2
HK	1, 85
HL	3, 18
HM	84, 85
HN	85, 84
HW	12, 20, 2
LA	14, 68, 56
LB	11, 73
LC	1, 74
LD	1, 76
LE	6A, 64
LF	63, 76
LG	64, 14
LJ	64, 65
LK	64, 68
LL	65, 70
LM	65, 74
LN	68, 69, 74
LP	70, 6B

COMPLEX MAPPING UNITS (continued)

Mapping Unit No.	Landtype Components
LQ	63, 64
LR	72, 11
LS	74, 7E
LT	75, 63
LU	75, 72
LV	70, 76
LW	76, 63
LX	76, 64
LY	76, 77, 70
LZ	77, 70
MC	16, 12, 20
MD	17, 12, 16
ME	17, 16, 12
MF	19, 73
MG	16, 4, 5
MH	28, 65
MJ	29, 65
MK	32, 64
ML	36, 72
MM	36, 6A
MN	63, 45
MP	63, 41
MR	65, 46
MU	67, 29
MV	85, 16
MW	36, 5
MX	20, 16, 2
NA	7C, 15
NB	9V, 7C
NC	9U, 15
PA	2B, 9G, 9Z
PC	84, 9B
PD	9J, 2B
PE	9L, 9S
PF	96, 43, 2B
PG	96, 9F
PH	96, 15
PJ	96, 97
PK	97, 11
PL	97, 9C
PM	97, 98
PN	98, 9Z
PP	97, 9Z, 9T
RB	61, 78, 14
RC	7K, 60
RD	78, 10, 61
RE	7K, 6C
SA	94, 17

COMPLEX MAPPING UNITS (continued)

Mapping Unit No.	Landtype Components
SB	95, 34
TA	50, 51, 10
TB	50, 53, 55
TC	51, 52, 10
TD	53, 61
TE	51, 50, 61, 55
TF	51, 52, 61, 55
WB	2, 16, 12
WC	2, 17
WE	43, 44
WF	44, 43, 5
WG	43, 96, 2B
WH	5, 43
WJ	8, 19, 5
XA	33, 34
XB	36, 4C
XD	36, 6A, 56
XE	39, 40
XG	40, 39
XH	44, 45
XJ	48, 49
XK	63, 15
XL	60, 53, 61
XM	70, 15
XN	72, 48
XP	81, 82, 9
XR	79, 52

VI GUIDE TO LANDTYPE STRATIFICATION BASED ON SOIL AND GEOLOGY

1. Miscellaneous Units:

   1, 2, 3*, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 18, 20, 53, 88, 89, 1A, 4C, 5A, 6G, 7C, 7T, 8C, 8E, 8P, 8T

2. Sandy to loamy soils over glacial till:

   16, 17, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32

3. Sandy to loamy soils over glacial outwash and lake deposits:

   35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 4A, 7J

4. Loamy to sandy pumice soils over volcanic tuffs and breccias:

   50, 51, 52, 54, 55, 56, 57, 58, 59

5. Loamy to sandy pumice soils over hard basalts, andesites, and rhyolites:

   60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 90, 6A, 6B, 6C, 6G, 6H, 6J, 7A, 7C, 7E, 7F, 7G, 7K

6. Loamy to sandy pumice soils on complex volcanic bedrock materials:

   84, 85, 86, 87, 91, 6E, 7H, 8A, 8B

7. Sandy loam to sandy pumice soils on cinder cones:

   80, 81, 82, 83

8. Deep soils formed from black, sandy volcanic ash:

   94, 95

9. Soils formed from coarse cinders (other than cinder cones):

   33, 34, 92, 93

10. Soils formed from thick (40-60 inches) pumice deposits:

    96, 97, 98, 9A, 9B, 9C, 9F, 9G, 9J, 9U, 9V, 9X, 9Z, 92, 2A, 2B, 7B, 7J

11. Soils formed from very thick (greater than 60 inches) pumice deposits:

    9K, 9L, 9M, 9N, 9P, 9R, 9S, 9T, 9W, 9Y, 2B, 6E

*Underlined numbers refer to landtypes having slopes that exceed 30 percent.

VII APPROXIMATE ACREAGE MAPPED OF EACH SOIL MAPPING UNIT

MAPPING UNIT	ACRES	MAPPING UNIT	ACRES
1	32,799	47	682
2	4,442	48	10,559
3	13,402	49	687
4	5,637	50	2,287
5	13,109	51	2,229
6	3,578	52	4,378
7	5,397	53	3,290
8	14,735	54	1,290
9	6,277	55	309
10	7,877	56	1,450
11	16,293	57	922
12	14,719	58	490
13	5,322	59	277
14	8,165	60	24,986
15	8,046	61	25,429
16	26,287	62	19,359
17	10,010	63	11,893
18	4,442	64	59,679
19	18,042	65	37,002
20	7,839	66	12,613
21	5,258	67	18,751
22	8,863	68	12,490
23	74	69	8,277
24	1,845	70	54,132
25	21,119	71	9,295
26	2,511	72	42,341
27	2,047	73	10,565
28	20,949	74	11,247
29	6,245	75	106
30	4,794	76	25,749
31	1,349	77	Mapped only in complexes
32	9,023	78	6,138
33	2,357	79	2,687
34	991	80	2,453
35	810	81	10,069
36	9,823	82	8,741
37	19,823	83	4,351
38	410	84	15,365
39	981	85	20,373
40	1,461	86	1,045
41	18,805	87	1,173
42	2,346	88	4,073
43	6,629	89	8,170
44	6,106	90	3,061
45	22,805	91	6,373
46	10,469	92	373
		93	1,002

MAPPING UNIT	ACRES
94	3,839
95	2,282
96	69,636
97	58,463
98	37,423
1A	1,252
2A	767
2B	8,869
4A	2,767
4C	1,338
5A	2,863
6A	40,570
6B	52,069
6C	2,122
6E	4,213
6G	1,530
6H	4,746
6J	12,655
7A	2,239
7B	357
7C	5,434
7E	14,954
7F	1,749
7G	1,039
7H	2,895
7J	1,765
7K	3,013
7T	1,114
8A	1,151
8B	1,557
8C	1,690
8E	1,098
8P	1,013
8T	1,098
9A	1,298
9B	2,223
9C	4,922
9F	8,703
9G	255
9J	1,221
9K	12,885
9L	33,370
9M	10,602
9N	9,999
9P	3,930
9R	3,882
9S	Mapped only in Complexes
9T	885
9U	11,999
9V	9,301
9W	3,279

MAPPING UNIT	ACRES
9X	937
9Y	730
9Z	8,666
GA	5,343
GB	4,490
GC	1,055
GD	101
GE	442
GF	1,226
GG	2,751
GH	1,573
GJ	1,999
GK	11,978
GL	1,343
GM	527
GN	2,677
GP	3,050
GR	2,853
GS	9,653
GT	341
GU	9,055
GV	3,333
GX	2,517
HB	1,674
HC	3,466
HD	3,567
HE	10,959
HF	1,178
HG	19,178
HJ	719
HK	4,042
HL	890
HM	12,191
HN	5,407
HW	2,810
LA	533
LB	661
LC	2,965
LD	11,162
LE	2,565
LF	522
LG	5,343
LJ	1,002
LK	3,498
LL	1,514
LM	6,501
LN	282
LP	1,701
LQ	1,551
LR	4,533
LS	1,962

MAPPING UNIT	ACRES
LT	2,501
LU	6,613
LV	3,733
LW	319
LX	8,442
LY	6,357
LZ	4,447
MC	26,047
MD	6,271
ME	3,642
MF	2,965
MG	3,743
MH	1,135
MJ	778
MK	25,669
ML	1,765
MM	3,439
MN	6,629
MP	8,837
MR	2,330
MU	314
MV	13,882
MW	1,178
MX	1,295
NA	2,645
NB	6,239
NC	2,207
PA	2,015
PC	1,450
PD	2,074
PE	1,205
PF	922
PG	11,146
PH	559
PJ	1,733
PK	1,034
PL	970
PM	3,055
PN	4,282
PP	437
RB	357
RC	1,327
RD	522
RE	677
SA	1,493
SB	405
TA	1,114
TB	2,330
TC	1,157
TD	165
TE	1,029

MAPPING UNIT	ACRES
TF	1,178
WB	2,671
WC	1,375
WE	2,570
WF	3,935
WG	3,642
WH	8,357
WJ	229
XA	861
XB	303
XD	10,069
XE	1,130
XG	1,573
XH	10,677
XJ	570
XK	2,501
XL	4,970
XM	3,535
XN	3,983
XP	879
XR	1,002
W	36,431
TOTAL	1,877,210

VIII SOIL AND LANDTYPE

INFORMATION AND INTERPRETATION TABLES

This section consists of a series of tables which give basic information on soils and landtypes, and interpretations for various management activities. The organization of information presented on these tables was discussed in the Introduction.

Definitions of the terms used in this section may be found in Appendix D and E.

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES - PART 1

Land-type No.	Landform	% Slope Range	% Mean Slope	Slope Aspect	Broad Forest Type	Elev. (Feet)	Annual Precip. (Inches)	Major Drainage Pattern and Intensity	Parent Materials	Depth to Buried Soil (Inches)
1	Barren, recent lava flows	0-30	10	Variable	Nonforest	2800-6500	12-70	N/A	N/A	N/A
2	High elevation drainages, draws, and seeps	0-50	10	Variable	Engelmann spruce Lodgepole Mtn. hemlock	5000-7000	40-70	Dendritic, abundant	Volcanic ash, pumice, alluvium, glacial till	N/A
3	Mountain peaks, rocky sites above timberline, rock outcrops	40-100+	75	Variable	Nonforest	5700-10,300	40-100	N/A	N/A	N/A
4	Gently sloping subalpine slopes, tablelands, glaciated uplands	0-30	15	Variable	Nonforest	5800-7800	50-70	Dendritic, few to common	Volcanic ash, pumice, glacial till	Variable
5	Wet depressions, meadows, nonforested bottomlands	0-10	3	Variable	Nonforest Meadow	3300-6800	20-70	N/A	Alluvium and organic materials	N/A
6	Steeply sloping, smooth to moderately dissected glacial valley walls; single slopes	30-80	60	South	True fir Mtn. hemlock	4400-7200	35-70	Parallel, few to common	Volcanic ash and glacial till	0-18
7	Depressions or flats, "pumice flats"	0-10	5	Variable	Nonforest	4700-6500	10-80	N/A	Volcanic ejecta; pumice and ash	24-60
8	Stream bottomlands	0-30	10	Variable	Mixed conifers	2200-5300	20-45	N/A	Alluvium and outwash	N/A
9	Cinder cones	25-70	50	Variable	Nonforest	4600-8000	10-80	Radial, few	Cinders	N/A
10	Narrow draws with steep side slopes	20-100	30	Variable	Ponderosa pine	3500-5500	15-40	Parallel, few	Sandy volcanic ash, pumice, colluvium and residuum	15-40
11	Rough lava flows	0-30	10	Variable	Variable	3000-6700	12-70	N/A	Small amounts of volcanic ash and pumice	N/A
12	Uneven glacial scoured uplands at high elevations, complex slopes	20-70	25	Variable	Mtn. hemlock	4700-7500	45-70	Dendritic, few to common	Volcanic ash and pumice; some residuum and colluvium	12-30
13	Moderate to highly dissected, steep single slopes near the top of composite or shield volcanos	30-80	60	Variable	Whitebark pine	5800-7800	50-80	Radial, common	Volcanic ash and pumice	N/A
14	Steeply sloping, rough edges of lava flows	25-80	50	Variable	Ponderosa pine	3500-5700	15-40	Parallel, few	Sandy volcanic ash, pumice, colluvium and residuum	Variable
15	Depression and flats	0-10	5	Variable	Lodgepole pine	4300-6000	12-50	N/A	Sandy volcanic ash, pumice lapilli	20-60
16	Smooth to rolling glaciated uplands, complex slopes	5-40	20	Variable	Mtn. hemlock	4300-6500	40-70	Dendritic, few to common	Sandy volcanic ash, pumice lapilli, and loamy soils on glacial till	18-36
17	Gently sloping glaciated upland, ground moraines, tablelands or broad benches	0-30	10	Variable	Lodgepole pine	4200-6500	40-60	Dendritic, few	Sandy volcanic ash and pumice over buried soils on glacial till	15-36
18	Steeply sloping glacial valley walls and glacial headwalls, single slopes	30-80	60	North	Mtn. hemlock	4200-6600	50-80	Parallel, common	Sandy volcanic ash and glacial till	10-30
19	Gentle to moderately sloping glacial uplands, ground moraines, tablelands and broad benches	0-30	10	Variable	Lodgepole pine	4700-6000	30-40	Dendritic, few	Sandy volcanic ash and pumice on a buried soil over glacial till	18-36
20	Uneven glaciated uplands with many pothole lakes; complex slopes	0-50	20	Variable	Lodgepole pine Mtn. hemlock	5300-6000	40-70	Dendritic, few to common	Volcanic ash, pumice, and glacial till	10 30
21	Steep, smooth, side slopes of glacial moraines	25-60	40	South	Ponderosa pine	3000-4700	25-35	Parallel, few	Sandy volcanic ash over buried soil on glacial till	15-30
22	Steep, smooth, side slopes of glacial moraines	25 60	40	North	Mixed conifers	3300 5700	25-40	Parallel, few	Sandy volcanic ash over buried soil on glacial till	15-30
23	Steep sideslopes of glacial moraines or glacial valley walls	25-60	40	North	Mixed conifers	4000-4500	40-60	Parallel and dendritic, few	Sandy volcanic ash over glacial till; Sand Mtn. - Nash Crater black sands	20-40
24	Hummocky and moderately dissected, steep slopes of glacial moraines with seeps	20-60	40	North	Mixed conifers	3600-4300	40-55	Parallel, common	Sandy volcanic ash over buried soil on glacial till	15-30

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES - PART 2

Land-type No.	Depth to Bedrock (Inches)	Type of Bedrock	Drainage Class	Infiltration Class	Root Distribution: Size	Root Distribution: Abundance	Root Distribution: Max. Concentration (in.)	Remarks; Representative Area
1	N/A	Basalt, andesite and rhyolite	N/A	N/A	N/A	N/A	N/A	Recent lava flows; a non-soil unit; as the lava flow near Lava Butte. Miscellaneous landtype.
2	N/A	N/A	Poorly to somewhat poorly drained	Variable Limited by watertable	Variable	Variable	Usually limited to upper 20 inches	Upper Forest drainages. This is a miscellaneous landtype.
3	N/A	Mixed volcanic rocks	N/A	N/A	N/A	N/A	N/A	This is a rocky landtype above timberline, as the top of Bachelor Butte and the Three Sisters. Miscellaneous landtype.
4	Variable	Mixed volcanic rocks	Well drained	Dendritic, few to common	Very fine to fine	Plentiful to few	0-12	High elevation openings with scattered trees. Common in the Broken Top area. Miscellaneous landtype.
					Coarse	Few	0-24	
5	N/A	N/A	Poorly to moderately well drained	Variable	Very fine to fine	Abundant	0-12	Wet depression, meadows; as Black Butte Meadow. Miscellaneous landtype.
				Limited by watertable	Coarse	Few	0-12	
6	0-120	Basalt, andesite, and rhyolite	Well to excessively drained	Rapid to moderate	Medium and coarse	Few to plentiful	0-24	South aspect of the ridge south of Jefferson Creek. Fairly common in the Mt. Jefferson area. Miscellaneous landtype.
7	40-100	Basalt and andesite	Excessively drained	Rapid	Fine to medium	Few	0-12	Examples are Pumice Flat and Dutchman Flat. Miscellaneous landtype.
8	N/A	N/A	Poorly to moderately well drained	Variable Limited by watertable	Fine to coarse	Abundant	0-20	Bottomlands along streams in the Principle Forest Zone. Periodic flooding. Miscellaneous landtype.
9	N/A	N/A	Excessively drained	Rapid	N/A	N/A	N/A	Lava Butte is an example. Miscellaneous landtype.
10	Variable	Variable	Excessively drained on sideslopes	Rapid to moderate	Very fine to coarse	Plentiful	0-30	Common west of Bend, as along Tumalo Creek in some segments. Miscellaneous landtype.
11	N/A	N/A	N/A	Rapid	Fine to coarse	Few	0-30	Rough lava flow land with very little soil. Miscellaneous landtype.
12	24-50	Basalt and andesite	Well to excessively drained	Rapid to moderate	Fine to coarse	Few to plentiful	0-30	Common along the Cascade Crest. Miscellaneous landtype.
13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	This is a very rocky miscellaneous landtype at high elevations near timberline. Very little soil material. An example is near the timberline on Bachelor Butte.
14	0-50	Basalt and andesite	Excessively drained	Rapid	Very fine to coarse	Plentiful to abundant	0-12	Associated with lava flow lands throughout the Forest. Miscellaneous landtype.
					Medium to coarse	Plentiful	12-36	
15	Variable	Variable	Excessively to well drained	Rapid	Very fine to coarse	Few to plentiful	0-40	Lodgepole - needlegrass basins. Miscellaneous landtype.
16	N/A	N/A	Well to excessively drained	Rapid	Fine to coarse	Plentiful to abundant	0-30	Common at upper elevations of the Cascades on glacial deposits. Commonly an "unwettable" surface soil layer.
17	N/A	N/A	Well to excessively drained	Rapid	Very fine to coarse	Plentiful	0-36	Common in the Three Creeks Lake vicinity.
18	20-120	Basalt, andesite, and rhyolite	Well to excessively drained	Rapid	Fine to coarse	Plentiful	0-30	Some slopes may have seeps. Avalanche tracks are fairly common. An example is the ridge southeast of Jefferson Lake. Miscellaneous landtype.
19	N/A	N/A	Well to excessively drained	Rapid	Very fine to coarse	Plentiful	0-36	Pocket gopher populations are often high. An example is in the Jack Pine Springs vicinity, Bend District.
20	Variable	Variable	Well drained on the uplands	Rapid to moderate	Fine to coarse	Plentiful	0-30	Many depressions and small lakes are present; "Many Lakes" area, west of Cultus Mountain. Miscellaneous landtype.
21	N/A	N/A	Excessively to well drained	Rapid	Very fine to coarse	Plentiful to abundant	0-15	Aspects may be northeasterly at the lower elevation. Common on ridges west of the Metolius River.
					Fine to coarse	Plentiful to few	15-40	
22	N/A	N/A	Well to excessively drained	Rapid	Very fine to coarse	Plentiful to abundant	0-15	Aspects may be somewhat southerly at the upper elevation limits. Common on ridges west of the Metolius River.
					Fine to coarse	Plentiful to few	15-40	
23	N/A	N/A	Well drained	Rapid	Very fine to coarse	Plentiful to abundant	0-15	West of Blue Lake and southeast of the Santiam Pass. These sandy soils erode along road cuts where runoff occurs over compact till.
					Fine to coarse	Plentiful	15-40	
24	N/A	N/A	Well drained (seeps are present within this landtype)	Rapid to moderate	Fine to coarse	Plentiful to abundant	0-36	Potential stability problems. Some locations along upper glacial slopes north of Suttle Lake to Sugar Pine Ridge, Sisters District.

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES - PART 1

Land-type No.	Landform	% Slope Range	% Mean Slope	Slope Aspect	Broad Forest Type	Elev. (Feet)	Annual Precip. (Inches)	Major Drainage Pattern and Intensity	Parent Materials	Depth to Buried Soil (Inches)
25	Moderately steep, smooth, complex slopes on glacial deposits	10-40	25	Variable	Mixed conifers	4400-5400	25-40	Dendritic, few	Sandy volcanic ash and pumice lapilli over a buried soil on glacial till	18-40
26	Toeslopes and alluvial fan	10-30	20	Variable	Ponderosa pine	3000-4000	25-35	Parallel and radial, common to few	Sandy volcanic ash and pumice, colluvium, alluvium, and glacial till	15-40
27	Long, steep to moderately steep, single slopes on glacial moraines	20-50	40	Variable	Mixed conifers	4200-4800	35-45	Dendritic to parallel, few	Sandy volcanic ash over loamy soils on glacial till	15-30
28	Moderately steep, smooth, complex slopes on glacial deposits	10-40	25	Variable	Mixed conifers	4300-5500	35-45	Dendritic, few to common	Sandy volcanic ash over buried soils on glacial till	15-36
29	Gently sloping ground moraines	5-20	10	Variable	Ponderosa pine	3600-5000	30-40	Dendritic, few	Sandy volcanic ash over buried soils on glacial till	20-40
30	Gentle slopes at the upper part of an out wash plain, adjacent to glacial uplands	0-15	5	Variable	Mixed conifers	3000-4000	30-40	Dendritic, common	Volcanic ash, alluvium, glacial outwash and glacial till	10-30
31	Steep, single slopes along glacial valley walls and moraines	25-70	50	Variable	True fir - Mtn. hemlock	4700-5500	40-60	Parallel, many to common	Pumice lapilli and volcanic ash over a buried soil on glacial till; some colluvium	20-40
32	Gentle to smooth, complex slopes on glacial till plains	0-30	12	Variable	Ponderosa pine	3700-4600	18-30	Dendritic, few	Sandy, pumiceous volcanic ash over a buried soil on glacial till	18-36
33	Gentle to smooth, complex slopes on glacial till plains	0-25	15	Variable	Mixed conifers	3500-4300	35-45	Dendritic, few	Gravelly cinders (Blue Lake) over volcanic ash on glacial till	24-80
34	Steep sideslopes of glacial moraines	25-60	35	Variable	Mixed conifers	3500-4000	40-60	Parallel, few	Gravelly cinders (Blue Lake) over volcanic ash on glacial till	24-80
35	Steep sides slopes of dissections in an outwash zone	25-60	35	South	Ponderosa pine	4400-5600	20-25	Parallel, few	Sandy, pumiceous volcanic ash and pumice lapilli over a buried soil on waterlain sands and gravels	20-40
36	Gently sloping outwash plains	0-30	5	Variable	Ponderosa pine Juniper	3200-4200	12-18	Dendritic, few	Sandy volcanic ash on buried soils formed from glacial outwash	15-36
37	Gently sloping outwash plains	0-20	5	Variable	Ponderosa pine	3200 4500	18-30	Dendritic, few	Sandy volcanic ash over buried soils on glacial outwash	18-36
38	Steep side slopes along dissections in outwash materials	25-60	35	North	Mixed conifers	4400-5800	22-30	Parallel, few	Sandy, pumiceous volcanic ash and pumice lapilli over a buried soil on waterlain sands and gravels	20-40
39	Gently sloping outwash plains and old lake basins	0-20	5	Variable	Ponderosa pine	3000-3300	25-35	Dendritic, few	Volcanic ash over buried soils on stratified waterlain sediments	18-40
40	Gently sloping outwash plains and old lake basins	0-10	5	Variable	Mixed conifers	3000-3200	25-35	Dendritic, common	Volcanic ash, alluvium, and glacial outwash	15-30
41	Gentle to moderately sloping outwash plains and terraces	0-25	12	Variable	Ponderosa pine	4200-5600	18-25	Dendritic and parallel, few	Sandy, pumiceous volcanic ash and pumice lapilli over a buried soil on waterlain sands and gravels	20-40
42	Gentle to moderately sloping outwash plains and terraces	0-25	12	Variable	Mixed conifers	4400-5800	25-30	Dendritic and parallel, few	Sandy, pumiceous volcanic ash and pumice lapilli over a buried soil on waterlain sands and gravels	20-40
43	Gently sloping outwash plains and bottomlands	0-5	3	Variable	Lodgepole pine	4200-4600	20-40	N/A	Sandy, pumiceous volcanic ash and pumice lapilli; alluvium; and glacial outwash	20-60

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES - PART 2

Land-type No.	Depth to Bedrock (Inches)	Type of Bedrock	Drainage Class	Infiltration Class	Root Distribution: Size	Root Distribution: Abundance	Root Distribution: Max. Concentration(in.)	Remarks: Representative Area
25	N/A	N/A	Excessively to well drained	Rapid	Fine to coarse	Plentiful	0-36	Similar to landtype 28 only the soils are coarser textured. Common on glacial deposits on the Bend District, so north of Big Spring.
26	N/A	N/A	Well drained, but located on sites that may receive concentrated runoff	Rapid	Fine to coarse	Plentiful to abundant	0-40	Occurs on some locations along Green Ridge and other locations on the Sisters and Bend Districts.
27	N/A	N/A	Well drained	Rapid	Fine to coarse	Plentiful	0-36	East portion of the Minco Burn, Sisters District. Snowbrush is dense after fire.
28	N/A	N/A	Well drained	Rapid	Fine to coarse	Plentiful	0 40	Common on glacial deposits of the Sisters District. An example is northwest of Trout Creek Butte.
29	N/A	N/A	Well drained	Rapid	Very fine to coarse	Plentiful to abundant	0-15	High potential for management. Typically occurs just downslope from landtype 28. On the Sisters District.
					Fine to coarse	Plentiful	15-40	
30	N/A	N/A	Somewhat poorly to moderately well drained	Moderate to rapid	Fine to coarse	Abundant to plentiful	0-24	Wetness is a problem during the spring runoff period. Some problems with shallow rooting zones. Occurs near Brush Creek, Sisters District.
31	40-120+	Basalt and andesite	Well drained	Rapid	Fine to coarse	Plentiful	0-20	Seeps and small drainages are common. Occurs near Odell Lake, Crescent District.
					Fine to coarse	Few	20-50	
32	N/A	N/A	Excessively to well drained	Rapid	Very fine to coarse	Abundant to plentiful	0 15	Manzanita increases rapidly after disturbance. Common between Bend and Triangle Hill.
					Fine to coarse	Plentiful to few	15-40	
33	N/A	N/A	Excessively drained	Rapid	Fine to coarse	Abundant	0-12	Cindery soils south of Suttle Lake.
					Fine to coarse	Plentiful to few	12-50	
34	N/A	N/A	Excessively drained	Rapid	Fine to coarse	Abundant to plentiful	0-12	Cindery soils; on slope south of Suttle Lake
					Fine to coarse	Plentiful to few	12-50	
35	N/A	N/A	Excessively drained	Rapid	Very fine to coarse	Abundant to plentiful	0-15	Common along the west slopes of the Paulina Mountains, south of Paulina Creek. Similar to landtype 38, except for aspect and vegetation.
					Fine to coarse	Plentiful	15-40	
36	N/A	N/A	Excessively drained	Rapid	Very fine to coarse	Abundant to plentiful	0-15	Usually occurs at lower elevations than landtype 37. Occurs near the town of Sisters.
					Fine to coarse	Plentiful	15 40	
37	N/A	N/A	Excessively to well drained	Rapid	Very fine to coarse	Abundant to plentiful	0-15	Between Sisters and Black Butte.
					Fine to coarse	Plentiful	15-40	
38	N/A	N/A	Well to excessively drained	Rapid	Very fine to coarse	Plentiful	0-15	Common along the west slopes of the Paulina Mountains, especially south of Paulina Creek. Associated with landtype 35.
					Fine to coarse	Plentiful to few	15 50	
39	N/A	N/A	Well drained	Rapid	Very fine to coarse	Abundant to plentiful	0-15	Similar to landtype 37 only on finer materials. Occurs in the Metolius River vicinity.
					Fine to coarse	Plentiful	15-40	
40	N/A	N/A	Poorly to moderately well drained	Slow to rapid Limited by watertable	Very fine to coarse	Abundant to plentiful	0-30	Some clayey soils are present in this landtype. Diatomaceous earth has been noted. Occurs in the Metolius River vicinity.
41	N/A	N/A	Excessively drained	Rapid	Very fine to coarse	Abundant to plentiful	0-12	Lower west slopes of the Paulina Mountains.
					Fine to coarse	Plentiful	12-50	
42	N/A	N/A	Excessively drained	Rapid	Fine to coarse	Plentiful to abundant	0-40	Middle westerly slopes of the Paulina Mountains.
					Fine to coarse	Few	40-50	
43	N/A	N/A	Poorly to somewhat poorly drained	Slow to moderate Limited by watertable	Very fine to coarse	Abundant	0-20	High watertable. Occurs in the Wickiup Reservoir area on lodgepole flats.

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES - PART 1

Land-type No.	Landform	% Slope Range	% Mean Slope	Slope Aspect	Broad Forest Type	Elev. (Feet)	Annual Precip. (Inches)	Major Drainage Pattern and Intensity	Parent Materials	Depth to Buried Soil (Inches)
44	Gently sloping outwash plains	0-5	3	Variable	Lodgepole pine	4200-4600	20-40	Dendritic, few	Sandy, pumiceous volcanic ash and pumice lapilli over a buried soil on glacial outwash	20-60
45	Gently sloping outwash plains	0-10	5	Variable	Lodgepole pine	4200-4600	20-30	Dendritic, few	Sandy, pumiceous volcanic ash and pumice lapilli over a buried soil on glacial outwash	20-40
46	Gently sloping outwash plains and terraces	0-15	5	Variable	Lodgepole pine	4300-4700	25-35	Dendritic, few	Sandy, pumiceous volcanic ash and pumice lapilli over a buried soil on glacial outwash	20-40
47	Gently sloping outwash plains and terraces	0-20	10	Variable	Lodgepole pine	5000-5500	18-24	Dendritic, few	Sandy, pumiceous volcanic ash over buried soils on outwash sands and gravels	12-30
48	Gently sloping outwash plains, terraces, and lake basins	0-20	5	Variable	Nonforest Sagebrush	3400-5000	8-12	Dendritic, few	Sandy volcanic ash over buried soils on waterlain sands and gravels	15-40
49	Steep side slopes of draws in outwash sands and gravels	20-50	35	Variable	Nonforest Sagebrush	4500-4900	8-17	Parallel, few	Sandy volcanic ash over buried soils on waterlain sands and gravels	10-30
50	Steep side slopes of canyon walls and ridges	30-70	50	South	Ponderosa pine Juniper	2300-4500	12-20	Parallel, few	Sandy volcanic ash over loamy residual soils	0-15
51	Steep side slopes of canyon walls	30-60	45	South	Ponderosa pine	2400-3800	18-25	Parallel, few	Sandy volcanic ash over loamy residual soils	8-20
52	Steep side slopes of canyon walls	30-60	45	North	Mixed conifers	2400-3800	18-25	Parallel, few	Sandy volcanic ash over loamy residual soils	10-30
53	Gently sloping table-lands, benches, and ridge tops	0-20	5	Variable	Juniper	2300 4400	10-15	Dendritic, few	Sandy volcanic ash over loamy residual soils	0-12
54	Gentle to moderately sloping uplands, benches, and tablelands	0-30	10	Variable	Mixed conifers	3300-4400	18-25	Dendritic, few	Sandy volcanic ash over loamy residual soils	10-24
55	Gentle to moderately sloping uplands, benches, and table-lands	0-30	10	Variable	Ponderosa pine	2500-3300	12-18	Dendritic, few	Sandy volcanic ash over loamy residual soils	10-24
56	Gently sloping pumice flow lands	0-30	10	Variable	Ponderosa pine	4000-4500	14-20	Dendritic, few	Sandy volcanic ash and pumice lapilli over buried soils on compact pumice	15-30
57	Steep side slopes of ridges and buttes	30-60	40	South	Ponderosa pine	4500-5000	20-30	Parallel, few	Sandy, pumiceous volcanic ash and pumice lapilli over residual soils and colluvium	15-40
58	Steep side slopes of ridges and buttes	30-60	40	North	Mixed conifers	4500-5000	20-30	Parallel, few	Sandy, pumiceous volcanic ash and pumice lapilli over residual soils and colluvium	18-40
59	Steep side slopes of canyon walls	30-80	40	South	Ponderosa pine	3700-4700	13-20	Parallel, few	Sandy, pumiceous volcanic ash over colluvium and residual soils	15-30
60	Gently sloping lava plains	0-30	10	Variable	Ponderosa pine Juniper	3200-5300	12-16	Dendritic, few	Fine, sandy volcanic ash and residual soil	6-24
61	Gently sloping uplands	0-20	10	Variable	Ponderosa pine	3200-4500	15-22	Dendritic, few	Sandy volcanic ash over loamy residual soils	10-24
62	Gently sloping uplands	0-30	10	Variable	Mixed conifers	3700-4500	22-30	Dendritic, few	Sandy volcanic ash over loamy residual soils	12-30
63	Gently sloping lava plains	0-10	7	Variable	Lodgepole pine	4200-5200	18-25	Dendritic, few	Sandy, pumiceous volcanic ash and pumice lapilli over sandy to loamy buried soils	20-40

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES PART 2

Land-type No.	Depth to Bedrock (Inches)	Type of Bedrock	Drainage Class	Infiltration Class	Root Distribution Size	Root Distribution Abundance	Root Distribution Max. Concentration(ft.)	Remarks Representative Area
44	N/A	N/A	Moderately well drained	Rapid to moderate	Very fine to coarse	Abundant	0-12	Watertable comes within five feet of the surface. East of Wickiup Reservoir.
					Fine to coarse	Plentiful to few	12-45	
45	N/A	N/A	Excessively to well drained	Rapid	Very fine to coarse	Abundant to plentiful	0-12	Watertable is greater than five feet. East of Wickiup Reservoir.
					Fine to coarse	Plentiful to few	12-50	
46	N/A	N/A	Excessively to well drained	Rapid	Fine to coarse	Plentiful	0-12	Similar to landtype 45 only at higher elevations and ground cover is different. West of Wickiup Reservoir.
					Fine to coarse	Few to plentiful	12-36	
47	N/A	N/A	Excessively drained	Rapid	Very fine to coarse	Abundant to plentiful		South of China Hat, Fort Rock District. Somewhat similar to landtype 45 except it lacks bitterbrush.
					Fine to coarse	Plentiful to few	15-40	
48	N/A	N/A	Excessively drained	Rapid to moderate	Very fine to medium	Abundant to plentiful	0-18	South of Horse Ridge, Fort Rock District.
					Fine to medium	Plentiful	18-40	
49	N/A	N/A	Excessively drained	Rapid to moderate	Very fine to medium	Plentiful	0-15	South of Horse Ridge, Fort Rock District. Similar to landtype 48 only the slopes are steeper.
					Very fine to medium	Plentiful to few	18-40	
50	6-30	Tuffs	Excessively drained	Moderate	Very fine to coarse	Plentiful to few	0-12	Some seeps are present in this landtype, although it is generally very dry. Northeast part of the Sisters District near Fly Creek.
51	10-40	Tuffs and breccias	Excessively to well drained	Moderate to rapid	Very fine to coarse	Plentiful to abundant	0-12	Green Ridge area, east of the escarpment. Similar to landtype 51 except for aspect and vegetation.
					Fine to coarse	Plentiful	12-30	
52	20-50	Tuffs and breccias	Well drained	Moderate to rapid	Fine to coarse	Abundant	0-15	Green Ridge area, east of the escarpment.
					Fine to coarse	Plentiful	15-30	
53	0-30	Tuffs, breccias, basalt, or andesite	Moderately well to excessively drained	Slow to rapid	Very fine to coarse	Abundant to few	0-12	Common on the northeast part of the Sisters District, as near Fly Lake. Miscellaneous landtype.
54	20-48	Tuffs and breccias, some andesite	Well drained	Moderate to rapid	Fine to coarse	Abundant to plentiful	0-30	Green Ridge area, from Meadow Creek northward.
55	20-40	Tuffs and breccias	Well drained	Moderate to rapid	Very fine to coarse	Abundant	0-12	Green Ridge area, northward from Meadow Creek. Similar to landtype 54 but occurs on drier sites.
					Fine to coarse	Plentiful	12-30	
56	24-50	Tuffs and compact pumice	Excessively drained	Rapid	Very fine to coarse	Plentiful	0-15	Southwest of Bend. Similar to landtype 55 except the soils are coarser textured.
					Fine to coarse	Few to plentiful	15-40	
57	20-50	Tuffs and breccias	Excessively drained	Rapid	Fine to coarse	Plentiful	0-30	Occurs on Wake Butte, Bend District.
58	20-50	Tuffs and breccias	Excessively drained	Rapid	Fine to coarse	Plentiful	0-30	Occurs on Wake Butte, Bend District.
59	18-50	Tuffs, breccias, basalt, and andesite	Excessively drained	Rapid	Very fine to coarse	Plentiful	0-30	Occurs along the lower portion of Tumalo Creek, west of Bend.
60	18-40	Basalt and andesite	Well to excessively drained	Moderate to rapid	Very fine to coarse	Abundant	0-12	Northeast part of the Sisters District and southeast part of the Fort Rock District.
					Fine to coarse	Plentiful to few	12-30	
61	20-40	Basalt and andesite	Well drained	Rapid to moderate	Very fine to coarse	Abundant to plentiful	0-12	Green Ridge area, south of Summit Springs.
					Fine to coarse	Plentiful	12-30	
62	20-50	Andesite and basalt	Well drained	Rapid to moderate	Very fine to coarse	Abundant to plentiful	0-12	Common just east of the Green Ridge escarpment. Moister site than landtype 61.
					Fine to coarse	Plentiful	12-36	
63	24-60	Basalt	Excessively to well drained	Rapid	Very fine to coarse	Plentiful to abundant	0-12	Occurs in the Sunriver vicinity, above the flood plain of the Deschutes River.
					Fine to coarse	Plentiful to few	12-40	

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES - PART 1

Land-type No.	Landform	% Slope Range	% Mean Slope	Slope Aspect	Broad Forest Type	Elev. (Feet)	Annual Precip. (Inches)	Major Drainage Pattern and Intensity	Parent Materials	Depth to Buried Soil (Inches)
64	Gentle to moderately sloping, uneven lava plains	0-30	15	Variable	Ponderosa pine	3400-5500	16-25	Dendritic, few	Sandy, pumiceous volcanic ash and pumice lapilli over sandy to loamy buried soils	20-40
65	Uneven lava flow lands and gentle lava plains	0-30	15	Variable	Mixed conifers	4500-5800	25-35	Dendritic, few	Sandy, pumiceous volcanic ash and pumice lapilli over sandy to loamy buried soils	20-40
66	Smooth, single slopes; toeslopes and benches associated with buttes	0-30	15	South	Ponderosa pine	4000-5500	18-30	Dendritic and radial, few	Sandy, pumiceous volcanic ash and pumice lapilli over sandy to loamy buried soils	20-40
67	Smooth, single slopes on toeslopes and benches of buttes	0-30	15	North	Mixed conifers	4500-5800	25-35	Dendritic and radial, few	Sandy, pumiceous volcanic ash and pumice lapilli over sandy to loamy buried soils	20-40
68	Steep side slopes of ridges and buttes	30-60	40	South	Ponderosa pine	4000-5800	20-35	Radial to parallel, few	Sandy, pumiceous volcanic ash and pumice lapilli over sandy to loamy buried soils of residuum and colluvium	20-40
69	Steep side slopes of ridges and buttes	30-60	40	North	Mixed conifers	4500-5800	25-35	Radial to parallel, few	Sandy, pumiceous volcanic ash and pumice lapilli over sandy to loamy residual and colluvial buried soils	20-40
70	Gently sloping lava plains	0-30	6	Variable	Lodgepole pine	4500-6000	18-25	Dendritic, few	Sandy, pumiceous volcanic ash and pumice lapilli over sandy to loamy buried soils	20-48
71	Moderately steep, long, side slopes of buttes and ridges	20-30	25	Variable	Ponderosa pine	3800-4600	14-18	Radial, few	Fine, sandy, volcanic ash over loamy residual soils	10-24
72	Gently sloping lava plains	0-20	8	Variable	Ponderosa pine	3700-5200	12-15	Dendritic, few	Sandy, pumiceous volcanic ash over sandy to loamy buried soils	20-40
73	Smooth to uneven lava flow lands, lava plains	0-30	10	Variable	Lodgepole pine	4000-5800	25-40	Dendritic, few	Sandy, pumiceous volcanic ash over sandy to loamy buried soils	20-40
74	Uneven, broken lava flows	0-30	10	Variable	Mixed conifer	4700-6000	25-35	N/A	Sandy volcanic ash and pumice lapilli mixed with highly fractured lavas	N/A
75	Uneven, broken lava flows	0-30	10	Variable	Ponderosa pine Juniper	4300-4600	12-15	N/A	Sandy volcanic ash and pumice lapilli mixed with highly fractured lavas	N/A
76	Uneven, broken lava flows	0-30	10	Variable	Ponderosa pine	4300-5900	15-25	N/A	Sandy volcanic ash and pumice lapilli mixed with highly fractured lavas	N/A
77	Uneven, broken lava flows	0-30	10	Variable	Lodgepole pine	5500-6500	20-30	N/A	Sandy volcanic ash and pumice lapilli mixed with highly fractured lavas	N/A
78	Steep, smooth to slightly dissected side slopes of ridges	30-60	40	South	Ponderosa pine	3200-5400	18-35	Parallel, few	Fine, sandy volcanic ash over loamy residual soils and colluvium	8-24
79	Steep, smooth to slightly dissected side slopes of ridges	30-60	40	North	Mixed conifers	3700-4600	20-30	Parallel, few	Fine, sandy volcanic ash over loamy residual soils and colluvium	10-30
80	Cinder cones	25-70	40	Variable	Juniper	4000-5200	10-15	Radial, few	Volcanic ash, over a buried soil on cinders	10-30
81	Cinder cones	25-70	40	South	Ponderosa pine	3200-6200	18-35	Radial, few	Sandy, pumiceous volcanic ash and pumice lapilli over cindery buried soils	15-40
82	Cinder cones	25-70	40	North	Mixed conifers	3500-6200	20-40	Radial, few	Sandy, pumiceous volcanic ash and pumice lapilli over cindery buried soils	10-40
83	Cinder cones	25-70	45	Variable	Mtn. hemlock	5700-6800	40-70	Radial, few	Sandy, pumiceous volcanic ash and pumice lapilli over cindery buried soils	15-40
84	Steep side slopes of shield volcanoes	30-80	45	Variable	Mtn. hemlock	6000-7000	40-80	Radial and parallel, few to common	Sandy, pumiceous volcanic ash and pumice lapilli over sandy buried soils	15-40

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES - PART 2

Land-type No.	Depth to Bedrock (Inches)	Type of Bedrock	Drainage Class	Infiltration Class	Root Distribution Size	Root Distribution Abundance	Root Distribution Max. Concentration (in.)	Remarks; Representative Area
64	24-60	Basalt	Excessively to well drained	Rapid	Very fine to coarse	Abundant to plentiful	0-12	Common landtype on the Bend and Fort Rock Districts, as between Bend and Lava Butte.
					Fine to coarse	Plentiful to few	12-40	
65	24-60	Basalt	Excessively to well drained	Rapid	Fine to coarse	Plentiful to abundant	0-15	Cooler and moister sites than landtype 64. An example is north of McKay Butte.
					Fine to coarse	Plentiful to few	15-40	
66	24-60	Basalt, andesite, and rhyolite	Well to excessively drained	Rapid	Very fine to coarse	Plentiful to abundant	0-15	Smoother slopes than landtype 64. An example is near the base of Pistol Butte.
					Fine to coarse	Plentiful to few	15-40	
67	24-60	Basalt, andesite, and rhyolite	Well to excessively drained	Rapid	Fine to coarse	Plentiful to abundant	0-12	Smoother slopes than landtype 65. Occurs on Trout Creek Butte.
					Fine to coarse	Plentiful to few	12-40	
68	24-60	Basalt, andesite, and rhyolite	Excessively drained	Rapid	Fine to coarse	Plentiful to abundant	0-15	This is a droughty landtype. Manzanita will increase rapidly after disturbance. Common on south slopes of lava domes, as Three Creek Butte.
					Fine to coarse	Plentiful to few	15-40	
69	24-60	Basalt, andesite, and rhyolite	Excessively to well drained	Rapid	Fine to coarse	Plentiful to abundant	0-15	Associated with landtype 68, only on north aspects. North slope of Three Creek Butte.
					Fine to coarse	Plentiful to few	15-40	
70	30-60	Basalt and andesite	Well to excessively drained	Rapid	Fine to coarse	Plentiful	0-12	Common on the southwest portion of the Fort Rock District. There are frost problems after clearing these sites.
					Fine to coarse	Plentiful to few	12-30	
71	18-40	Basalt, andesite, and rhyolite	Well to excessively drained	Rapid to moderate	Very fine to coarse	Abundant	0-15	Squaw Back Ridge, Sisters District. Somewhat similar to landtype 61 except for slope.
					Fine to coarse	Plentiful	15-30	
72	24-50	Basalt and andesite	Well to excessively drained	Rapid	Very fine to coarse	Plentiful	0-15	Common at lower elevations of the Fort Rock District. Rabbitbrush increases after site disturbance.
					Fine to coarse	Plentiful to few	15-40	
73	24-50	Basalt and andesite	Excessively to well drained	Rapid	Very fine to coarse	Plentiful	0-12	North of Katalo Butte, Bend District.
					Fine to coarse	Plentiful to few	12-30	
74	20-40	Basalt	Excessively drained	Rapid	Fine to coarse	Plentiful to few	0-36	Very stony soils. West of Lolo Butte, Bend District.
75	10-40	Basalt	Excessively drained	Rapid	Very fine to coarse	Plentiful to few	0-36	Very stony soils. Arnold Ice Cave vicinity, Fort Rock District.
76	10-40	Basalt	Excessively drained	Rapid	Fine to coarse	Plentiful to few	0-36	Very stony soils. Lona Butte vicinity, Fort Rock District.
77	10-40	Basalt	Excessively drained	Rapid	Fine to coarse	Plentiful to few	0-36	Very stony soils. Lockit Butte vicinity, Fort Rock District
78	20-50	Andesite, basalt, and rhyolite	Excessively to well drained	Rapid to moderate	Very fine to coarse	Plentiful to abundant	0-15	Green Ridge area.
					Fine to coarse	Plentiful	15-40	
79	24-50	Andesite, basalt, and rhyolite	Well drained	Rapid to moderate	Fine to coarse	Plentiful to abundant	0-18	Green Ridge area.
					Fine to coarse	Plentiful	18-40	
80	N/A	N/A	Excessively drained	Rapid	Very fine to coarse	Abundant to plentiful	0-24	Cayore Butte is an example. Occurs along the edge of the Fort Rock District.
81	N/A	N/A	Excessively drained	Rapid	Fine to coarse	Plentiful to abundant	0-15	Common on south slopes of buttes on the Bend and Fort Rock Districts.
					Medium to coarse	Plentiful	15-36	
82	N/A	N/A	Excessively to well drained	Rapid	Fine to coarse	Plentiful to abundant	0-15	Common on north slopes of buttes on the Bend and Fort Rock Districts.
					Medium to coarse	Plentiful	15-36	
83	N/A	N/A	Excessively to well drained	Rapid	Fine to coarse	Plentiful	0-12	Buttes at high elevations, as between Tumalo Mill and Three Creeks Lake.
					Medium to coarse	Plentiful to few	12-30	
84	20-70	Mixed volcanics, mostly basalt	Excessively to well drained	Rapid	Fine to coarse	Plentiful	0-10	Steep side slopes of Bachelor Butte. There are coarse pumice soils at the surface in the Devils Lake vicinity.
					Medium to coarse	Plentiful to few	10-36	

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES – PART 1

Land-type No.	Landform	% Slope Range	% Mean Slope	Slope Aspect	Broad Forest Type	Elev. (Feet)	Annual Precip. (Inches)	Major Drainage Pattern and Intensity	Parent Materials	Depth to Buried Soil (Inches)
85	Gentle to moderately steep slopes on lava plains and benches or toeslopes on major volcanos	0-30	15	Variable	Mtn. hemlock	6000-6800	40-80	Dendritic, few	Sandy, pumiceous volcanic ash and pumice lapilli over sandy to loamy buried soils	20-40
86	Steep, moderately dissected slopes on composite volcanos	30-60	40	North	Mixed conifer	4500-6400	25-40	Radial and parallel, common	Fine, sandy, volcanic ash over sandy to loamy residual and colluvial soils	18-36
87	Steep, moderately dissected, exposed slopes on composite volcanos	30-60	40	South	Ponderosa pine	4500-6400	25-35	Radial and parallel, common	Fine, sandy, volcanic ash over sandy to loamy residual and colluvial soils	12-30
88	Steeply sloping, moderate to highly dissected slopes on fault escarpments	30-80	55	West	Ponderosa pine	3500-4600	25-35	Parallel, common	Fine, sandy, volcanic ash over sandy to loamy residual and colluvial soils; often mixed	10-24
89	Steep, highly dissected slopes along a fault escarpment	30-80	65	Variable	Mixed conifers	3300-4700	18-35	Parallel, many	Fine, sandy, volcanic ash; colluvium; and loamy residual soils; often mixed	Variable
90	Gentle to moderately sloping toeslopes and benches	0-30	15	Variable	Mixed conifers	3200 3600	25-35	Parallel to dendritic, few	Fine, sandy, volcanic ash; loamy residual soils; and colluvium	10-24
91	Smooth to moderately dissected steep side slopes of volcanic mountains	35-60	40	Variable	Nonforest Sagebrush Bunchgrass	4900-6400	10-20	Dendritic, few to common	Volcanic ash and some pumice lapilli over loamy colluvium and residual soils	6-24
92	Gently sloping lava plains and flanks of shield or composite volcanos	0-30	10	Variable	Lodgepole pine	5800-6500	25-35	Dendritic, few	Gravelly cinders over sandy volcanic ash on sandy to loamy buried soils	30-100
93	Gently sloping lava plains	0-30	10	Variable	Ponderosa pine	4000-5000	18-25	Dendritic, few	Gravelly cinders over sandy volcanic ash on sandy to loamy buried soils	30-100
94	Uneven glaciated uplands, scoured and depositional	5-40	15	Variable	Lodgepole pine True firs Mtn. hemlock	4400 4900	50-80	Dendritic, few	Black volcanic sands and other volcanic ash over buried soils on glacial till or bedrock	30-80
95	Moderately steep to gentle, complex slopes on glacial deposits	0-30	15	Variable	Mixed conifers	3700-4400	40-60	Dendritic, common	Black volcanic sands and other volcanic ash over buried soils on glacial till	30-60
96	Gently sloping outwash plains	0-30	5	Variable	Lodgepole pine	4200-4900	20-30	Dendritic, few	Pumice lapilli and volcanic ash over buried soils on glacial outwash.	0-80
97	Gentle to moderately sloping lava flows and lava plains	0-30	15	Variable	Ponderosa pine	4500-5500	25-30	Dendritic, few	Pumice lapilli and pumiceous volcanic ash over sandy to loamy buried soils	32-60
98	Gentle to moderately sloping lava flows and lava plains	0-30	15	Variable	Mixed conifers	4500-6000	25-35	Dendritic, few	Pumice lapilli and pumiceous volcanic ash over sandy to loamy buried soils	33-60
1A	Steep, rocky slopes on lava domes at high elevations	30-100	65	Variable	Mtn. hemlock	5500-6500	50-70	Parallel, few	Pumice lapilli, volcanic ash, and colluvium	N/A
2A	Gently sloping glacial till plains	0-30	8	Variable	Lodgepole pine Mtn. hemlock	5000-5500	45-50	Dendritic, few	Pumice lapilli (Devils Hill) over volcanic ash on a buried soil over glacial till	20-60
2B	Gently sloping glacial uplands and broad glacial valley floors	0-30	10	Variable	Lodgepole pine	5000-6000	35-45	Dendritic, few	Pumice lapilli and pumiceous volcanic ash over buried soils on glacial till	36-88
4A	Gently sloping uplands	0-30	8	Variable	Lodgepole pine	5500-6200	25-30	Dendritic, few	Sandy, pumiceous volcanic ash over sandy to loamy buried soils on waterlain sands and gravels	20-40

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES – PART 2

Land-type No.	Depth to Bedrock (Inches)	Type of Bedrock	Drainage Class	Infiltration Class	Root Distribution Size	Root Distribution Abundance	Root Distribution MAX-Concentration (in.)	Remarks; Representative Area
85	20-70	Mixed volcanics, mostly basalt	Excessively to well drained	Rapid	Fine to coarse	Plentiful	0-10	Toeslopes of Bachelor Butte.
					Medium to coarse	Plentiful to few	10-36	
86	28-60	Complex volcanics	Well drained	Rapid	Very fine to coarse	Abundant to plentiful	0-15	North slope of Black Butte.
					Medium to coarse	Plentiful	15-40	
87	24-50	Complex volcanics	Excessively drained	Rapid	Fine to coarse	Plentiful to abundant	0-18	South slope of Black Butte.
					Medium to coarse	Plentiful	18-36	
88	10-60	Stratified pyroclastics, basalt, and andesite	Excessively to well drained	Rapid to moderate	Fine to coarse	Plentiful to abundant	0-15	Green Ridge escarpment. Limited by steep slopes, stoniness, and shallow soils. Miscellaneous landtype.
					Medium to coarse	Plentiful to few	15-30	
89	Variable	Tuffs, breccias, basalt, andesite, and waterlain sediments	Excessively drained	Moderate to rapid	Variable	Variable	Variable	Green Ridge escarpment and the Metolius breaks. Miscellaneous landtype.
90	30-60	Stratified volcanics and waterlain deposits	Well drained	Moderate to rapid	Very fine to coarse	Abundant to plentiful	0-15	Toeslopes and benches along the Green Ridge escarpment.
					Fine to coarse	Plentiful	15-45	
91	18-40	Andesite, basalt, tuffs, and breccias	Excessively to well drained	Rapid to moderate	Very fine to medium	Plentiful to abundant	0-12	Occurs on Pine Mountain.
					Very fine to medium	Plentiful to few	12-30	
92	40-100+	Basalt	Excessively drained	Rapid	Fine to coarse	Plentiful	0-16	Southeast of Pilpil Butte, Fort Rock District.
					Medium to coarse	Plentiful to few	10-30	
93	50-100+	Basalt	Excessively drained	Rapid	Fine to coarse	Plentiful	0-12	Near Lava Butte.
					Medium to coarse	Plentiful to few	12-30	
94	36-200	Basalt and andesite	Well to excessively drained	Rapid	Fine to coarse	Abundant	0-8	South of the Santiam Pass. Much of this landtype was burned over by the Airstrip burn.
					Medium to coarse	Plentiful	8-24	
					Fine to coarse	Few	24-50	
95	N/A	N/A	Well to excessively drained	Rapid	Fine to coarse	Abundant	0-12	Island Lake – Meadow Lake area, southeast of the Santiam Pass.
					Fine to coarse	Plentiful	12-40	
96	N/A	N/A	Excessively drained	Rapid	Fine to coarse	Abundant to plentiful	0-10	Lodgepole flats near Crescent.
					Medium to coarse	Plentiful to few	10-50	
97	40-80	Basalt and andesite	Well to excessively drained	Rapid	Fine to coarse	Abundant to plentiful	0-12	East of Davis Mountain. Occurs south of Wickiup Reservoir, Crescent District.
					Medium to coarse	Plentiful to few	12-40	
98	40-80	Basalt and andesite	Excessively well drained	Rapid	Fine to coarse	Abundant to plentiful	0-12	East slope of Davis Mountain. Occurs south of Wickiup Reservoir, Crescent District.
					Medium to coarse	Plentiful to few	12-40	
1A	0-60	Andesite, rhyolite, and basalt	Excessively to well drained	Rapid, where soil is present	Variable	Variable	Variable	Kaleetan Butte, Bend District. Miscellaneous landtype.
2A	N/A	N/A	Well to excessively drained	Rapid	Fine to coarse	Plentiful	0-6	North of Elk Lake, near Sink Creek, on the Cascade Lakes Highway.
					Fine to coarse	Plentiful to few	6-30	
2B	N/A	N/A	Excessively drained	Rapid	Fine to coarse	Plentiful	0-8	Southwest of Crescent Lake, Crescent District
					Medium to coarse	Plentiful to few	8-30	
4A	N/A	N/A	Excessively drained	Rapid	Very fine to coarse	Plentiful	0-10	Upper west slopes of the Paulina Mountains.
					Fine to coarse	Plentiful	10-40	

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LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES - PART 1

Land-type No.	Landform	% Slope Range	% Mean Slope	Slope Aspect	Broad Forest Type	Elev. (Feet)	Annual Precip. (Inches)	Major Drainage Pattern and Intensity	Parent Materials	Depth to Buried Soil (Inches)
4C	Alluvial fans and toeslopes	5-40	15	Variable	Nonforest Sagebrush-Bunchgrass	4500-5200	10-15	Radial, common to many	Volcanic ash, pumice, and alluvium; material if often mixed	0-24
5A	Steeply sloping ridges at high elevations	30-80	50	Variable	Mtn. hemlock	5800-7000	50-80	Parallel, few	Sandy, pumiceous volcanic ash and pumice lapilli over sandy to loamy buried soils	10-40
6A	Gently sloping lava plains	0-30	8	Variable	Ponderosa pine	4500-5000	14-17	Dendritic, few	Sandy, pumiceous volcanic ash over sandy to loamy buried soils	20-40
6B	Gently sloping lava plains	0-30	10	Variable	Ponderosa pine-Lodgepole pine	4500-5700	20-30	Dendritic, few	Sandy, pumiceous volcanic ash and pumice lapilli over sandy to loamy buried soils	20-40
6C	Gently sloping lava plains	0-30	10	Variable	Juniper-Ponderosa pine	5000-5400	10-12	Dendritic, few	Fine, sandy volcanic ash and loamy residual soils	0-15
6E	Moderately steep side slopes of major volcanos	10-40	25	North	Lodgepole pine	6000-6500	25-30	Dendritic, few	Pumice gravel, and volcanic ash, colluvium, and residual soils	30-80
6G	Depressions in lava plains	0-20	10	Variable	Ponderosa pine	4000-4600	15-20	N/A	Sandy, pumiceous volcanic ash over sandy to loamy buried soils	20-40
6H	Gently sloping lava plains and uneven lava flow lands	0-30	15	Variable	Mixed conifers	5400-6000	30-40	Dendritic, few	Sandy, pumiceous volcanic ash and pumice lapilli over sandy to loamy buried soils	20-40
6J	Gently sloping lava plains and lava flow lands	0-30	10	Variable	Ponderosa pine-Lodgepole pine	4800-5200	13-25	Dendritic, few	Sandy, pumiceous volcanic ash and pumice lapilli over sandy to loamy buried soils	20-40
7A	Rough, lava flow lands	0-30	10	Variable	Lodgepole pine-Mtn. hemlock	5800-7000	25-35	N/A	Sandy, pumiceous volcanic ash and pumice lapilli mixed with highly fractures lavas	N/A
7B	Rough, lava flow lands	0-30	15	Variable	Lodgepole pine-Mtn. hemlock	5500-6000	50-60	N/A	Pumice, gravel (Devils Hill) and volcanic ash with highly fractured lavas	N/A
7C	Uneven lava flow lands	0-30	10	Variable	Nonforest Sagebrush	4700-4900	10-12	N/A	Pumice gravel (Newberry) on broken lavas	N/A
7E	Gentle to moderately sloping lava flows on the flanks of major volcanos	0-30	10	Variable	Lodgepole pine	5500-6200	20-30	Dendritic, few	Sandy, pumiceous volcanic ash and pumice lapilli over sandy to loamy buried soils	20-40
7F	Gentle to moderately sloping lava flows on the flanks of major volcanos	0-30	15	Variable	Lodgepole pine-Mtn. hemlock	6200-6800	30-60	Dendritic to radial, few	Sandy, pumiceous volcanic ash and pumice lapilli over sandy to loamy buried soils	20-40
7G	Moderately steep to steep side slopes on major volcanos	10-40	25	Variable	Lodgepole pine-Mtn. hemlock	6300-6500	25-30	Dendritic to radial, few	Pumice gravel (Newberry) and volcanic ash over sandy buried soils	30-80
7H	Steep side slopes of volcanic mountains	25-50	40	North	Ponderosa pine	5200-6000	15-25	Dendritic to parallel, few	Sandy volcanic ash, colluvium, and sandy to loamy residual soil	12-30
7J	Gently sloping outwash plains or lake basins	0-10	5	Variable	Lodgepole pine	4700-4900	10-12	N/A	Gravelly pumice (Newberry) and volcanic ash over sandy to loamy buried soils on waterlain sands and gravels	20-50
7K	Steep side slopes of mountains and lava domes	30-70	40	South	Ponderosa pine	5400-6000	12-15	Parallel to radial, few	Sandy volcanic ash and loamy to sandy residual soil and colluvium	0-15
7T	Narrow ridgetops	5-30	20	Variable	Nonforest Bunchgrass-Sagebrush	6000-6400	15-25	Radial, few	Sandy volcanic ash and sandy to loamy residual soil	0-15
8A	Steep side slopes on shield of composite volcanos	30-70	50	Variable	Mixed conifers with Mtn. hemlock	5800-6500	40-70	Radial to parallel, few	Pumice lapilli and sandy volcanic ash over sandy to loamy buried soils	20 40
8B	Gentle to moderately steep slopes on benches and toeslopes of buttes	0-30	15	Variable	Mixed conifers with Mtn. hemlock	5500-6200	40-70	Radial to dendritic, few	Pumice lapilli and sandy volcanic ash over sandy to loamy buried soils	20-40
8C	Steep slopes of a caldera wall	30-80	50	South	Mixed conifers with Mtn. hemlock	6300-7500	30 40	Radial to parallel, few	Pumice lapilli, volcanic ash, and cinders	Variable

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LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES - PART 2

Land-type No.	Depth to Bedrock (Inches)	Type of Bedrock	Drainage Class	Infiltration Class	Root Distribution Size	Root Distribution Abundance	Root Distribution Max. Concentration(In.)	Remarks; Representative Area
4C	N/A	N/A	Excessively to well drained (may receive concentrated runoff)	Rapid to moderate	Very fine to medium	Plentiful to abundant	0-10	Alluvial fans near the base of Pine Mountain. Miscellaneous landtype.
					Very fine to medium	Plentiful to few	10-40	
5A	0-60	Tuffs and breccias	Excessively to well drained	Rapid, where there is soil	Variable	Variable	Variable	Miscellaneous landtype. Irish Mountain is an example.
6A	24-50	Basalt and andesite	Excessively to well drained	Rapid	Very fine to coarse	Abundant	0-15	Common at the lower elevations of the Fort Rock District. Commonly occurs between Landtypes 72 and 64.
					Fine to coarse	Plentiful to few	15-40	
6B	24-50	Basalt and andesite	Well to excessively drained	Rapid	Fine to coarse	Plentiful	0-18	An example is just west of the Lava Cast Forest, Fort Rock District.
					Medium to coarse	Plentiful to few	18-40	
6C	18-40	Basalt and andesite	Well to excessively drained	Rapid to moderate	Very fine to medium	Plentiful to abundant	0-12	Southwest part of the Fort Rock District and near Pine Mountain.
					Fine to coarse	Plentiful to few	12-30	
6E	40-120	Complex volcanics	Excessively drained	Rapid	Fine to coarse	Plentiful	0-20	On the upper northeast slopes of the Paulina Mountains.
					Medium to coarse	Plentiful to few	20-50	
6G	24-50	Basalt	Well to excessively drained	Rapid	Very fine to coarse	Plentiful to few	0-40	Miscellaneous landtype. Frost pockets in the ponderosa pine type. Occurs in the northwest part of the Fort Rock District.
6H	24-50	Basalt and andesite	Well to excessively drained	Rapid	Fine to coarse	Plentiful to abundant	0 20	Similar to landtype 65 only at higher elevations. An example is near Kapka Butte on the Bend District.
					Fine to coarse	Plentiful to few	20-40	
6J	30-50	Basalt and andesite	Well to excessively drained	Rapid	Very fine to coarse	Abundant to plentiful	0-18	Transitional between landtypes 63 and 64. Southwest and west part of the Fort Rock District.
					Fine to coarse	Plentiful to few	18-40	
7A	10-40	Basalt	Excessively drained	Rapid	Fine to coarse	Plentiful to few	0-30	Occurs on the upper north slopes of the Paulina Mountains.
7B	24-50	Basalt	Excessively drained	Rapid	Fine to coarse	Plentiful to few	0-40	West of Devils Lake.
7C	0-60	Basalt	Excessively drained	Rapid	Fine to coarse	Few	Variable	Southeast of Pine Mountain at the edge of the "potholes" area.
7E	24-50	Basalt	Excessively drained	Rapid	Fine to coarse	Plentiful to few	0-40	Upper to mid-slopes of the Paulina Mountains.
7F	24-50	Basalt and andesite	Well to excessively drained	Rapid	Fine to coarse	Plentiful	0-36	Upper, nonglaciated slopes of the Cascades; es north of Summit Lake.
7G	24-80	Basalt, andesite, tuffs, and breccias	Excessively drained	Rapid	Fine to coarse	Plentiful	0-10	Upper southeast slopes of the Paulina Mountains.
					Medium to coarse	Plentiful to few	10-30	
7H	24-50	Andesite, basalt, tuffs, breccias	Excessively to well drained	Rapid to moderate	Very fine to coarse	Plentiful to abundant	0-15	North slopes of Pine Mountain.
					Medium to coarse	Plentiful	15-40	
7J	N/A	N/A	Excessively drained	Rapid	Fine to coarse	Plentiful	0-8	Southeast of Pine Mountain, near Sand Springs.
					Fine to coarse	Plentiful to few	8-30	
7K	18-40	Basalt, andesite, rhyolite	Excessively to well drained	Rapid to moderate	Very fine to coarse	Plentiful to abundant	0-12	Southeast part of the Fort Rock District, as on Long Butte.
					Fine to coarse	Plentiful	12-30	
7T	10-24	Andesite, basalt, breccias, and tuffs	Well drained	Moderate	Very fine to medium	Abundant to few	0-20	Ridge tops on Pine Mountain. A miscellaneous landtype.
8A	30-80	Basalt, andesite, tuffs, and breccias	Well to excessively drained	Moderate	Fine to coarse	Plentiful to abundant	0-20	Occurs on Maklaks Mountain, Crescent District.
					Medium to coarse	Plentiful to few	20-40	
8B	30-80	Basalt, andesite, tuffs, and breccias	Well drained	Rapid	Fine to coarse	Plentiful to abundant	0-20	Occurs on Maklaks Mountain, Crescent District.
					Medium to coarse	Plentiful to few	20-40	
8C	Variable	Complex volcanics	Excessively drained	Rapid	Variable	Variable	Variable	A miscellaneous landtype. Occurs in Newberry Crater, north of Paulina and East Lakes.

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DESCHUTES NATIONAL FOREST

LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES - PART 1

Land-type No.	Landform	% Slope Range	% Mean Slope	Slope Aspect	Broad Forest Type	Elev. (Feet)	Annual Precip. (Inches)	Major Drainage Pattern and Intensity	Parent Materials	Depth to Buried Soil (Inches)
8E	Highly dissected, steep slopes and eroded draws on the flanks of major volcanos	20-70	40	Variable	Lodgepole pine Mtn. hemlock	6500-7400	25-30	Dendritic and parallel, many	Sandy, pumiceous volcanic ash and pumice lapilli over gravelly to loamy buried soils	Variable
8P	Cinder cones at high elevations	25-65	45	Variable	Mtn. hemlock	5800-7500	30-70	Radial, few	Pumice gravel (mostly Newberry) on cindery soils and cinders	N/A
8T	Steep slopes on tuff rings and tuffaceous cones	20-70	40	Variable	Varies from Mtn. hemlock to ponderosa pine	4500-7000	12-50	Radial, few	Sandy volcanic ash, pumice lapilli, colluvium, and residual soil	Variable
9A	Steep, moderately dissected slopes on composite volcanos	30-70	40	North	Mixed conifers	4500-6000	30-40	Radial to parallel, common	Pumice lapilli and volcanic ash over sandy to loamy colluvial and residual soils	36-60
9B	Steep upper side slopes on composite volcanos; single slopes; smooth to slightly dissected	30-70	45	North	Mixed conifers with Mtn. hemlock	5700-6500	35-45	Radial to parallel, few	Pumice lapilli and volcanic ash over sandy to loamy colluvial and residual soils	36-60
9C	Smooth to slightly dissected, steep, side slopes of composite volcanos	30-70	40	South	Ponderosa pine	4400-5800	20-35	Radial to parallel, few	Pumice lapilli and volcanic ash over sandy to loamy colluvial and residual soils	36-60
9F	Gently sloping till plains and outwash plains	0-30	10	Variable	Ponderosa pine	4400-5000	20-25	Dendritic, few	Pumice lapilli and volcanic ash over sandy to loamy buried soils on glacial deposits	30-50
9G	Gentle to moderately steep, complex slopes on glacial deposits	0-30	15	Variable	Mixed conifers	4600-5300	30-40	Dendritic, few to common	Pumice lapilli and volcanic ash over sandy to loamy buried soils on glacial till	36-65
9J	Steep side slopes of glacial morsines	30-60	40	North	Mixed conifers	4600-5400	30-45	Parallel, few	Pumice lapilli and volcanic ash over sandy to loamy buried soils on glacial till	36-55
9K	Gently sloping table-lands and broad ridgetops at high elevations	0-30	10	Variable	Lodgepole pine Mtn. hemlock	5800-7000	35-60	Dendritic, few	Pumice gravel and volcanic ash	60-150
9L	Gentle to moderately sloping lava plains or till plains	0-30	10	Variable	Ponderosa pine Lodgepole pine	4500-5500	20-25	Dendritic, few	Pumice gravel and volcanic ash	60-150
9M	Gentle to moderately steep lava plains and till plains	0-30	15	Variable	Mixed conifers	4500-6000	25-40	Dendritic, few	Pumice gravel and volcanic ash	60-150
9N	Steep slopes along glacial moraines, valley walls, or ridges	30-70	45	North	Mixed conifers	4500-6000	30-45	Parallel, few	Pumice gravel and volcanic ash	60-150
9P	Steep, moderately dissected glacial valley walls and moraines	30-70	45	North	Mtn. hemlock with mixed conifers	4500-6000	40-65	Parallel, common	Pumice gravel and volcanic ash	60-150
9R	Steep, smooth, side slopes on moraines or ridges	30-70	45	South	Ponderosa pine Lodgepole pine	4400-5600	25-40	Parallel, few	Pumice gravel and volcanic ash	60-150
9S	Steep, moderately dissected slopes of mornines or lava ridges	30-70	40	South	Ponderosa pine Lodgepole pine	4400-5600	20-30	Parallel, common to many	Pumice gravel and volcanic ash	60-150
9T	Cinder cones	25-60	45	Variable	Ponderosa pine and mixed conifers	5000-5500	20-35	Radial, few	Pumice gravel and volcanic ash	40-150
9U	Gentle to moderately sloping, smooth to uneven lava plains	0-30	10	Variable	Ponderosa pine Lodgepole pine	5000-5800	18-25	Dendritic, few	Pumice gravel (Newberry) and volcanic ash over buried soils on waterlain sands and gravels or basaltic bedrock	30-100
9V	Uneven lava flow lands	0-30	10	Variable	Lodgepole pine Ponderosa pine	5200-5800	18-25	N/A	Pumice gravel (Newberry) and volcanic ash mixed with broken lavas	N/A
9W	High elevation table-lands and gently sloping broad ridgetops	0-30	10	Variable	Mtn. hemlock with mixed conifers	5800-6500	30-50	Dendritic, few	Pumice gravel and volcanic ash	60-150

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LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES - PART 2

Land-type No.	Depth to Bedrock (Inches)	Type of Bedrock	Drainage Class	Infiltration Class	Root Distribution Size	Root Distribution Abundance	Root Distribution Max. Concentration (In.)	Remarks; Representative Area
8E	Variable	Complex volcanics, mostly soft pyroclastics	Excessively to well drained	Rapid to moderate	Variable	Variable	Variable	Occurs on the upper north slopes of the Paulina Mountains. Miscellaneous landtype.
8P	N/A	N/A	Excessively drained	Rapid	Fine to coarse	Plentiful	0-12	Cinder cones on the upper east slopes of the Paulina Mountains.
					Medium to coarse	Few to plentiful	12-50	
8T	0-40	Tuffs and breccias	Excessively drained	Rapid	Variable	Variable	Variable	Examples occur on several tuff rings within the Newberry Crater. Miscellaneous landtype.
9A	50-100	Basalt and andesite, some tuffs and breccias	Well to excessively drained	Rapid	Fine to coarse	Plentiful to abundant	0-15	North slope of Odell Butte. Occurs only on the Crescent District.
					Medium to coarse	Plentiful to few	15-50	
9B	50-120	Basalt and andesite with some tuffs and breccias	Well to excessively drained	Rapid	Fine to coarse	Plentiful to abundant	0-15	Upper north slopes of Odell Butte.
					Medium to coarse	Plentiful to few	15-50	
9C	50-120	Basalt and andesite with some tuffs and breccias	Excessively drained	Rapid	Fine to coarse	Abundant to plentiful	0-18	South slope of Odell Butte.
					Medium to coarse	Plentiful to few	18-50	
9F	N/A	N/A	Excessively drained	Rapid	Fine to coarse	Abundant to plentiful	0-15	Occurs between the town of Crescent and Odell Butte.
					Medium to coarse	Plentiful to few	15-50	
9G	N/A	N/A	Excessively to well drained	Rapid	Fine to coarse	Abundant to plentiful	0-15	Near the east end of Odell Lake.
					Medium to coarse	Plentiful to few	15-50	
9J	N/A	N/A	Excessively to well drained	Rapid	Fine to coarse	Abundant to plentiful	0-15	Northeast of Odell Lake, near Maklaks Mountain.
					Medium to coarse	Plentiful to few	15-50	
9K	60+	Basalt and other volcanic rocks	Excessively to well drained	Rapid	Fine to coarse	Plentiful	0-8	South of the Upper Little Deschutes River. Some surface nonwettability.
					Medium to coarse	Plentiful	8-24	
					Fine to coarse	Few	24-60	
9L	60+	Basalt and other volcanic rocks	Excessively drained	Rapid	Fine to coarse	Abundant to plentiful	0-15	West of Walker Rim, Crescent District. Some surface nonwettability.
					Medium to coarse	Plentiful to few	15-50	
9M	60+	Basalt and other volcanic rocks	Well to excessively drained	Rapid	Fine to coarse	Abundant to plentiful	0-15	Gentle slopes east of Big Marsh, Crescent District.
					Medium to coarse	Plentiful to few	15-50	
9N	60+	Basalt, andesite, and other volcanic rocks	Excessively to well drained	Rapid	Fine to coarse	Abundant to plentiful	0-15	Near Chinquapin Butte and Walker Rim, Crescent District.
					Medium to coarse	Plentiful to few	15-50	
9P	60+	Basalt, andesite, and other volcanic rocks	Excessively to well drained	Rapid	Fine to coarse	Abundant to plentiful	0-15	Some steep slopes in the Big Marsh Creek and Upper Little Deschutes River area.
					Medium to coarse	Plentiful to few	15-50	
9R	60+	Basalt, andesite, and other volcanic rocks	Excessively drained	Rapid	Fine to coarse	Abundant to plentiful	0-15	Upper Little Deschutes Canyon, below Hemlock Butte.
					Medium to coarse	Plentiful to few	15-50	
9S	60+	Basalt, andesite, and other volcanic rocks	Excessivel drained	Rapid	Fine to coarse	Abundant to plentiful	0-15	Occurs on some sites below Walker Rim.
					Medium to coarse	Plentiful to few	15-50	
9T	N/A	N/A	Excessively drained	Rapid	Fine to coarse	Abundant to plentiful	0-15	Muttonchop Butte, Crescent District.
					Medium to coarse	Plentiful to few	15-50	
9U	40+	Basalt	Excessively drained	Rapid	Fine to coarse	Plentiful	0-10	East slopes of the Paulina Mountains. Newberry pumice zone.
					Medium to coarse	Plentiful to few	10-50	
9V	12-70	Basalt	Excessively drained	Rapid	Fine to coarse	Plentiful to few	0-30	East slopes of the Paulina Mountains. Newberry pumice zone.
9W	60+	Basalt and other volcanic rocks	Excessively to well drained	Rapid	Fine to coarse	Plentiful to abundant	0-15	Between the Upper Little Deschutes River and the Winema National Forest. Lower elevations than landtype 9K.
					Medium to coarse	Plentiful to few	15-50	

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES - PART 1

Land-type No.	Landform	% Slope Range	% Mean Slope	Slope Aspect	Broad Forest Type	Elev. (Feet)	Annual Precip. (Inches)	Major Drainage Pattern and Intensity	Parent Materials	Depth to Buried Soil (Inches)
9X	Steep side slopes of ridges or draws	25-50	40	North	Mixed conifers	5200-5800	18-25	Parallel, few	Pumice gravel (Newberry) and volcanic ash on buried soils on outwash or lavas	30-100
9Y	Moderately steep to gentle, complex slopes on glacial deposits at high elevations; wet spots are common	10-40	20	Variable	Mtn. hemlock True fire	5800-6500	45-60	Dendritic, common	Pumice gravel and volcanic ash over glacial till	60-150
9Z	Smooth, steep slopes on the flanks of composite volcanos	30-70	40	North	Mixed conifers	4500-6000	30-40	Parallel and radial, common	Pumice lapilli and volcanic ash over sandy to loamy buried soils	40-60

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES - PART 2

Land-type No.	Depth to Bedrock (Inches)	Type of Bedrock	Drainage Class	Infiltration Class	Root Distribution			Remarks: Representative Area
					Size	Abundance	Max. Concentration (In.)	
9X	40+	Basalt	Excessively to well drained	Rapid	Fine to coarse	Plentiful	0-12	East slopes of the Paulina Mountains. Newberry pumice zone.
					Medium to coarse	Plentiful to few	12-50	
9Y	N/A	N/A	Well drained with some wet spots	Rapid	Fine to coarse	Plentiful to abundant	0-15	Upper Little Deschutes River area.
					Medium to coarse	Plentiful to few	15-50	
9Z	50-100	Basalt and andesite	Well to excessively drained	Rapid	Fine to coarse	Abundant to plentiful	0-20	North slope of Hamner Butte; found between Wickiup Reservoir and Odell Butte on the Crescent District.
					Medium to coarse	Plentiful to few	20-50	

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

VEGETATION CHARACTERISTICS OF LANDTYPES

Land-type no.	Major Deschutes NF Ecoclass Ident. Codes	Ecoclass Mapping Codes	Total Vegetative Cover %	Overstory		Understory*		Ground Cover		Timber Site Species	Timber Site Index	Cubic Foot Site Class	Range Productivity (lbs./Acre)
				Major Species	Veg. Cover %	Major Species	Veg. Cover %	Major Species	Veg. Cover %				
1	NC	NC	Nonveg.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	CW-CF-11 CHY1 CAY1	F1 H1 R1	80-95	Lodgepole pine Englemann spruce True fire	40-80	Willow Huckleberry	20-40	Sedges Grasses Forbs Mosses	30-80	N/A	Variable	Variable	0-50
3	NR	NR	Nonveg.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	NR	NR	5-30	Mtn. hemlock True fira	0-15	Huckleberry Heather	0-10	Sedges Grasses Forbs	2-15	Unproductive for timber			20-50
5	MW MD 19-11 MM-9 MM-19	MN MD MM	70 100	N/A	N/A	Willow Alder	0-40	Grasses Sedges Forbs Rushes Mosses	20-100	N/A	N/A	N/A	Variable
6	NR	NR	20-60	Mtn. hemlock Silver fir Lodgepole pine	10-50	Snowbrush Snowberry Manzanita	0-20	Sedges	0 5	Very low timber site			0-50
7	NC SD 93-23	NC RF	0-5	N/A	N/A	N/A	N/A	Forbs Sedges Grasses	0-5	N/A	N/A	N/A	0-50
8	CW-CF-11	E1	80-95	Engelmann spruce Lodgepole pine White fir Ponderosa pine Douglas-fir	60-80	Alder Willow Vine maple Pacific yew	10-80	Forbs Sedges Grasses Mosses	20-70	Timber site is variable			0-50
9	NC	NC	0-30	Juniper Ponderosa pine or Mtn. hemlock	0-20	Manzanita	0-20	Grasses Sedges Forbs	0-10	Unproductive			0-20
10	CPY3 CWY1	P3 W1	30-80	Ponderosa pine White fir	20-70	Manzanita Bitterbrush Snowbrush	20-50	Idaho fescue Sedges	5-20	Timber site is variable			Variable
11	NC	NC	10-50	Varies with elevation. Ponderosa pine White fir or Mtn. hemlock	10-50	Rock spirea Willow Manzanita Snowbrush	0-30	Grasses Sedges Forbs	Trace	Very low site			N/A
12	NR CHY1	N1	40-95	Mtn. hemlock True fira Lodgepole pine	30-70	Huckleberry Kearberry Snowbrush	5 40	Grasses Sedges Forbs Mosses	0-10	Very low site			0-50
13	NR	NR	0-20	Whitebark pine Mtn. hemlock Alpine fir	0-15	Heather	0-10	Woodrush Partridge foot Penstemon	0-10	N/A	N/A	N/A	N/A
14	CPY3	P3	30-80	Ponderosa pine	30-80	Manzanita Snowbrush Bitterbrush Rabbitbrush	30-70	Idaho fescue Sedges	5-30	Timber site is variable			0-100
15	CLY6	L6	5-30	Lodgepole pine	5-30	Bitterbrush	0-5	Needlegrass	0-5	Very low site quality			0-20
16	CMY1	M2	60-90	Mtn. hemlock True fira	60-80	Huckleberry Snowbrush	10-30	Princess pine Sedges Pinemat manzanita Blueberry Huckleberry Mosses	10-30	Very low site quality			0-50
17	CMY1 CMY1	R1 M2	40-80	Lodgepole pine True fira Mtn. hemlock	40-70	Huckleberry	5-30	Sedges Needlegrass Lupine Pinemat manzanita	0-30	Lodgepole pine 20-30	6-7		0-50
18	CMY1	M2	70-90	Mtn. hemlock True fira Lodgepole pine	60-80	Huckleberry	0-20	Sedges Moss	0-20	Very low site quality			N/A
19	CLY7 CLY8	L7 L8	70-90	Lodgepole pine White fir	30-80	Snowbrush	0-20	Sedges Lupine Needlegrass Penstemon	5-20	Lodgepole pine 30-40	5-6		50-100
20	CMY1 CW-CF-11 CRY1	R1 E1 R1	40-80	Lodgepole pine True fira Mtn. hemlock Engelmann spruce	40-70	Huckleberry Pinemat manzanita	5-20	Sedges Kearberry Grasses Forbs Mosses	5 30	Low site quality			0-50
21	CPY7 CW-S1-15 CP C1 14	F7 W6 W8	70-90	Ponderosa pine	40-70	Manzanita Snowbrush Bitterbrush	10-60	Sedges Bracken fern	5-20	Ponderosa pine 70-85	5		0-50
22	CW-S1-13	W9	80-90	White fir Douglas-fir Ponderosa pine	60-90	Snowbrush Snowberry Manzanita Willow Vine maple	20-50	Sedges Princess pine Oregon grape Trailing blackberry	5-15	Ponderosa pine 75-95 White fir 45-55	4-5 4		0-50

* Reproduction of various tree species is included in the understory vegetation.
Refer to overstory species to indicate the type of reproduction likely to be present.

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

VEGETATION CHARACTERISTICS OF LANDTYPES

Land-type No.	Major Deschutes NF Ecoclass Ident. Codes	Ecoclass Mapping Codes	Total Vegetative Cover %	Overstory Major Species	Overstory Veg. Cover %	Understory* Major Species	Understory* Veg. Cover %	Ground Cover Major Species	Ground Cover Veg. Cover %	Timber Site Species	Timber Site Index	Cubic Foot Site Class	Range Productivity (lbs./Acre)
23	CD-S6-13	W8	80-90	White fir Douglas-fir	60-90	Snowbrush Snowberry Willow Vine maple	20-50	Sedges Oregon grape Trailing blackberry Forbs Sedges	5-20	White fir Douglas-fir	45-55 90-110	4 4 5	0-50
24	CW-S1-13 CD-S6-13	W6 W8	80-90	White fir Douglas-fir White pine	60 90	Snowbrush Manzanita Snowberry Willow Vine maple	20-50	Sedges Oregon grape Mosses Penstemon	5-20	White fir Douglas-fir	45-55 80-100	4 5	0-5
25	CW-S1-15	W6	70-90	White fir Ponderosa pine Lodgepole pine	60-80	Manzanita Snowbrush	30-50	Sedges	10-20	Ponderosa pine	75-90	4 5	0-50
26	CD-S6-13 CW-S1-15	W8 W6	70-90	Ponderosa pine White fir Douglas-fir Incense cedar	60 80	Manzanita Snowbrush	5-30	Sedges Pinegrass Forbs	5-30	Ponderosa pine	75-95	4-5	0-50
27	CD-S6-13 CW-C2-12 CW-C7-14	W8 W4 W5	80-95	Ponderosa pine White fir Douglas-fir	60-80	Snowbrush Chinquapin	30-80	Sedges Pinegrass Bracken fern	10-20	Ponderosa pine White fir	80-100 45-55	4-5 4	0-50
28	CW-S1-13 CD-S6-13	W6 W8	70-95	White fir Douglas-fir Ponderosa pine White pine	60-85	Snowbrush Manzanita Currant Snowberry	10 40	Pinegrass Bracken fern Sedges Peavine Penstemon	10-40	Ponderosa pine White fir	80-100 45 60	4-5 3 4	0-100
29	CW S1 13 CW-C7-12 CW-C2-12	W6 F7 W4	70 95	Ponderosa pine White fir	60-80	Snowbrush Manzanita Chinquapin	5-20	Pinegrass Bracken fern Sedges Penstemon	10-40	Ponderosa pine White fir	80-100 45-60	4-5 3-4	100-500
30	CD S6 12	W9	80 95	White fir Douglas-fir	70-90	Vine maple Willow Snowberry Spirea Alder	5-20	Oregon grape Trailing blackberry Princess pine Mosses Forbs	20-50	White fir	45-60	3-4	0-50
31	CD-S6-13 CPY1	W8 S1	80-95	White fir Douglas-fir Mtn. Hemlock White pine Shasta red fir	50-90	Snowbrush Manzanita Huckleberry Chinquapin Serviceberry	5-20	Sedges Mosses Forbs	5-40	White fir Mtn. hemlock	Not determined		0-50
32	CPY7 CPY3	F7 F3	60-90	Ponderosa pine	40-80	Manzanita Bitterbrush Snowbrush	20-80	Idaho fescue Sedges Needlegrass	10-30	Ponderosa pine	65-85	5	50-100
33	CD-S6-13	W8	70-95	White fir Douglas-fir White pine Ponderosa pine	60-90	Snowbrush Chinquapin Serviceberry Snowberry	5 30	Sedges Oregon grape Trailing blackberry Mosses Forbs Bracken fern	10-40	Douglas fir	90 120	4-5	0-50
34	CD-S6-13	W8	70-95	White fir Ponderosa pine Douglas-fir	60-80	Snowbrush Snowberry Chinquapin	5-20	Oregon grape Trailing blackberry Forbs Sedges	5-30	Douglas-fir	90-100	5	0 50
35	CPY7 CPY3	F7 F3	60-80	Ponderosa pine	40-70	Manzanita Snowbrush Bitterbrush	10-30	Idaho fescue Sedges Needlegrass	10-20	Ponderosa pine	60-80	5-6	0-100
36	CPY8 CPY1	F8 F1	50-70	Ponderosa pine Juniper	20-60	Bitterbrush Rabbitbrush Sagebrush	20-50	Idaho fescue Cheatgrass Needlegrass	10-40	Ponderosa pine	Low site potential		100-300
37	CPY1 CPY3	F1 F3	50-80	Ponderosa pine	40 70	Manzanita Bitterbrush Snowbrush	10-60	Idaho fescue Sedges Needlegrass	5-40	Ponderosa pine	60-85	5-6	50-200
38	CMY1 CPY2	W1 F2	60-90	White fir Ponderosa pine Lodgepole pine	60-80	Snowbrush Manzanita	10-40	Sedges Needlegrass	5-20	Ponderosa pine	70 85	5	0-50
39	CPY1	F1	50-80	Ponderosa pine	40-70	Bitterbrush	10-50	Idaho fescue Arrow leaf balsamroot Strawberry	10-50	Ponderosa pine	60-80	5-6	50-300
40	CD-S6-12	W9	70-95	White fir Douglas-fir Ponderosa pine Western larch Lodgepole pine	60-80	Snowberry Alder Serviceberry Willow	0-10	Forbs Grasses Sedges Rushes		White fir	45-60	3-4	0-300
41	CPY3 CPY1 CPY2	F3 F1 F2	80-90	Ponderosa pine Lodgepole pine	50-80	Manzanita Bitterbrush	20-50	Idaho fescue Sedges Squirreltail	5 30	Ponderosa pine	60-80	5-6	50-200
42	CMY1 CPY2	W1 F2	80-95	Ponderosa pine White fir Lodgepole pine	60-90	Snowbrush Manzanita	10-50	Sedges Needlegrass	5-20	Ponderosa pine	70-85	5	0-50

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SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

VEGETATION CHARACTERISTICS OF LANDTYPES

Land-type No.	Major Deschutes NF Ecoclass Ident. Codes	Ecoclass Mapping Codes	Total Vegetative Cover %	Overstory Major Species	Overstory Veg. Cover %	Understory* Major Species	Understory* Veg. Cover %	Ground Cover Major Species	Ground Cover Veg. Cover %	Timber Site Species	Timber Site Index	Cubic Foot Site Class	Range Productivity (lbs./Acre)
43	CLY1	L1	80-95	Lodgepole pine	40 80	Bearberry Blueberry	5-50	Grasses Sedges Forbs Mosses	40-80	Lodgepole pine	30-45	5-6	200-1000
44	CLY2	L2	70-90	Lodgepole pine	60-90	Bitterbrush Bearberry	10-50	Forbs Sedges Needlegrass Idaho fescue	5-50	Lodgepole pine	35-50	5	0 100
45	CLY3 CL-S2-11	L3	60-90	Lodgepole pine	50-80	Bitterbrush	30-50	Idaho fescue Squirreltail Needlegrass	5-40	Lodgepole pine	40-50	5	50-100
46	CLY5 CLY4	L5 L4	50-80	Lodgepole pine	40-70	Bitterbrush	5-20	Needlegrass Squirreltail Sedges Lupine	5-10	Lodgepole pine	35-45	5	0-50
47	CLY3	L3	50-80	Lodgepole pine	40-70	Bitterbrush Currant	0-5	Idaho fescue	20-50	Lodgepole pine	30-35	6	50-100
48	SD-1	S1	40-75	Juniper Ponderosa pine	0-5	Sagebrush Rabbitbrush	40-70	Idaho fescue	10-40	N/A	N/A	N/A	200-500
49	SD-1	S1	40-70	Juniper Ponderosa pine	0 5	Sagebrush Rabbitbrush Bitterbrush	30-60	Idaho fescue Cheatgrass Needlegrass	10-40	N/A	N/A	N/A	50-200
50	CPY8 CPY1	F8 F1	30 70	Ponderosa pine Juniper	5-30	Bitterbrush Sagebrush	5-20	Idaho fescue Cheatgrass Balsamroot	10-40	Low timber site potential			50-200
51	CPY3 CPY7	F3 F7	50-80	Ponderosa pine	40-70	Bitterbrush Manzanita Snowbrush	10-50	Idaho fescue Squirreltail Balsamroot Squawcarpet Needlegrass	10-30	Ponderosa pine	60-80	5-6	0-100
52	CW-C2-12 CW-S6-13 CPY9	W4 W8 F9	75-90	Douglas-fir Ponderosa pine White fir Larch	60-85	Snowbrush Chinquapin Snowberry Manzanita	20-50	Sedges Pinegrass Princess pine Forbs	5-10	Ponderosa pine Douglas-fir	70-90 80 100	4-5 5	0-50
53	CJ-S3-11	J1	10-50	Juniper	5-40	Sagebrush Bitterbrush	5-20	Idaho fescue Tapered Cheatgrass Needlegrass	0-20	N/A	N/A	N/A	0-200
54	CPY9 CW-C2-12 CD-S6 13	F9 W4 W8	70-90	Ponderosa pine Douglas-fir White fir Incense cedar	60-80	Snowbrush Chinquapin Manzanita Snowberry	10-50	Forbs Pinegrass Sedges Squawcarpet Squirreltail	5-20	Ponderosa pine Douglas-fir	70-85 90-100	5 5	0-100
55	CPY3 CPY1 CPY7	F3 F1 F7	50-80	Ponderosa pine	50-70	Bitterbrush Manzanita	10-50	Idaho fescue Needlegrass	10-40	Ponderosa pine	60-75	5-6	50-200
56	CPY1 CP-S2 12	F1 P5	50-80	Ponderosa pine	50-70	Bitterbrush Manzanita	10-50	Idaho fescue Needlegrass	5-20	Ponderosa pine	60-75	5-6	0-200
57	CPY2	F2	60-80	Ponderosa pine	50-70	Manzanita Bitterbrush Snowbrush	10-60	Idaho fescue Sedges Squirreltail	5-10	Ponderosa pine	60-80	5-6	0 50
58	CMY1	W1	70-90	White fir Ponderosa pine	70-85	Snowbrush Manzanita	10-60	Sedges Needlegrass	5-10	Ponderosa pine	70-85	5	0-50
59	CPY1	F1	50-80	Ponderosa pine Juniper	30-60	Manzanita Bitterbrush Rabbitbrush	30-70	Idaho fescue	10-30	Ponderosa pine	50-70	5-6	50-100
60	CPY8 CPY1	F8 F1	50-80	Ponderosa pine Juniper	30-60	Bitterbrush Rabbitbrush Sagebrush	20-50	Idaho fescue Cheatgrass	10-40	Ponderosa pine	40-60	6	100-300
61	CPY3 CPY7	F3 F7	60-80	Ponderosa pine Incense cedar	40-70	Bitterbrush Manzanita	10 40	Idaho fescue Peavine Squawcarpet Needlegrass	10-50	Ponderosa pine	60-80	5-6	0-100
62	CD-S6-13 CW-C2-12	W8 W4	80-90	Douglas-fir White fir Ponderosa pine	60-85	Snowbrush Manzanita Chinquapin Oceanspray Snowberry Currant	10-40	Peavine Princess pine Pinegrass Forbs	10-30	Ponderosa pine	75-90	4-5	0-100
63	CLY1	L3	60-90	Lodgepole pine	40-60	Bitterbrush	30-60	Idaho fescue Squirreltail Needlegrass	10-40	Lodgepole pine	40-50	5	50 100
64	CPY1 CPY2 CPY7 CPY1	F3 F2 F7 F1	60-90	Ponderosa pine	40-80	Bitterbrush Manzanita Snowbrush	20-60	Idaho fescue Sedges Needlegrass	10-40	Ponderosa pine	70-85	5	50-200

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SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

VEGETATION CHARACTERISTICS OF LANDTYPES

Land-type No.	Major Deschutes NF Ecoclass Ident. Codes	Ecoclass Mapping Codes	Total Vegetative Cover %	Overstory Major Species	Overstory Veg. Cover %	Understory* Major Species	Understory* Veg. Cover %	Ground Cover Major Species	Ground Cover Veg. Cover %	Timber Site Species	Timber Site Index	Cubic Foot Site Class	Range Productivity (lbs./Acre)
65	CMY1 CW-S1-15	W1 W6	70-90	Ponderosa pine White fir Lodgepole pine	60-85	Snowbrush Manzanita	20-60	Sedges Squirreltail Needlegrass	2-10	Ponderosa pine	75-95	4-5	0-50
66	CPY3 CPY2 CTY7 CPY1	P3 P2 P7 P1	60-80	Ponderosa pine	50-80	Bitterbrush Manzanita	20-60	Idaho fescue Needlegrass	5-40	Ponderosa pine	65-85	5	50-200
67	CW-S1-15 CP-S3-12 CW HL-11	W6 P4 W2	70-95	Ponderosa pine White fir	60-90	Snowbrush	10-50	Sedges Needlegrass	5-20	Ponderosa pine	75-95	4-5	0-50
68	CPY3 CTY7 CPY2	P3 P7 P2	60-90	Ponderosa pine	40-80	Manzanita Bitterbrush	30-70	Idaho fescue Needlegrass	10-20	Ponderosa pine	65-85	5	0-50
69	CWY1 CW-S1-15 CW-N1-11 CW-S1-13	W1 W6 W2 W9	80-95	White fir Ponderosa pine Douglas-fir Lodgepole pine	70-90	Snowbrush	10-50	Sedges Needlegrass Penstemon	5-20	Ponderosa pine	75-95	4-5	0-50
70	CLY5	L5	60-80	Lodgepole pine	50-70	Bitterbrush Currant	5-40	Needlegrass Sedges Squirreltail	0-10	Lodgepole pine	40-50	5	0-50
71	CTY3 CPY7	P3 P7	70-90	Ponderosa pine Incense cedar	50-70	Manzanita Bitterbrush Snowbrush	20-60	Idaho fescue Sedges	10-30	Ponderosa pine	60-80	5-6	0-100
72	CPY8	P8	50-80	Ponderosa pine Juniper	20-60	Bitterbrush Currant Rabbitbrush Sagebrush	30-60	Idaho fescue Needlegrass Squirreltail	10-30	Ponderosa pine	45-65	6	100-500
73	CLY8 CLY7	L8 L7	60-90	Lodgepole pine White fir	50-80	Currant	5-30	Lupine Sedges Needlegrass Penstemon	2-15	Lodgepole pine	40-50	5	0-100
74	CW-S1-15	W6	50-80	White fir Lodgepole pine Ponderosa pine	40-70	Snowbrush Currant Spirea	10-60	Sedges Needlegrass	2-10	Ponderosa pine	50-80	5-6	0-50
75	CPY8	P8	50-70	Ponderosa pine Juniper	40-60	Bitterbrush Rabbitbrush Sagebrush	20-50	Idaho fescue Squirreltail Needlegrass	5-20	Ponderosa pine	40-60	6	0-200
76	CPY3 CTY2 CPY7	P3 P2 P7	50-80	Ponderosa pine Lodgepole pine	40-70	Manzanita Bitterbrush Currant	20-60	Idaho fescue Sedges Needlegrass	5-10	Ponderosa pine	50-80	5-6	0-50
77	CLY7 CTY2	L7 P2	60-90	Lodgepole pine	50-80	Snowbrush Currant Bitterbrush	10-30	Lupine Sedges Needlegrass	2-10	Lodgepole pine	30-40	5-6	0-50
78	CPY9 CPY7	P9 P7	60-90	Ponderosa pine	50-80	Manzanita Bitterbrush	20-50	Needlegrass Sedges Idaho fescue	5-20	Ponderosa pine	60-80	5-6	0-100
79	CPY9 CW-S6-13 CW-C2-12	P9 W8 W4	70-90	White fir Douglas-fir Ponderosa pine Larch	60-85	Snowbrush Chinquapin Vine maple Snowberry Serviceberry	20-60	Forbs Sedges Pinegrass	5-30	Ponderosa pine Douglas-fir	80-100 90-110	4-5 4-5	0-50
80	CPY8 CT-S3-11	P8 J1	60-70	Juniper Ponderosa pine	2-30	Sagebrush Bitterbrush Rabbitbrush Mtn. mahogany	30-70	Idaho fescue Cheatgrass Wheatgrass	5-30	Very low site quality			0-200
81	CPY3 CPY7 CPY2	P3 P7 P2	60-90	Ponderosa pine	40-70	Manzanita Bitterbrush	30-80	Idaho fescue Needlegrass Sedges	2-20	Ponderosa pine	60-80	5-6	0-100
82	CWY1 CW-S1-15 CPY7	W1 W6 P7	75-95	White fir Ponderosa pine	60-85	Snowbrush Manzanita	30-60	Sedges Needlegrass	2-20	Ponderosa pine	70-95	4-5	0-50
83	CMY1 CRY1	M1 R1	70-90	Mtn. hemlock Lodgepole pine True firs	60-80	Huckleberry Snowbrush	5-30	Sedges Woodrush Pinemat manzanita	2-20	Low timber site potential			0-50
84	CMY1	M1	70-90	Mtn. hemlock	60-80	Huckleberry	2-10	Woodrush Sedges Mosses	2-10	Low timber site potential			0-50
85	CMY1 CRY1	M1 R1	70-90	Mtn. hemlock True firs	60-80	Huckleberry	0-20	Sedges Woodrush Pinemat manzanita Mosses	2-15	Low timber site potential			0-50
86	CW-C2-12 CW-C2-11	W4 W3	80-95	Ponderosa pine White fir Douglas-fir	60-85	Snowbrush Chinquapin Manzanita	10-40	Sedges Bracken fern Pinegrass Princess pine	5-20	Ponderosa pine	80-100	4-5	0-50

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SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

VEGETATION CHARACTERISTICS OF LANDTYPES

Land-type No.	Major Deschutes NF Ecoclass Ident. Codes	Ecoclass Mapping Codes	Total Vegetative Cover %	Overstory Major Species	Overstory Veg. Cover %	Understory* Major Species	Understory* Veg. Cover %	Ground Cover Major Species	Ground Cover Veg. Cover %	Timber Site Species	Timber Site Index	Cubic Foot Site Class	Range Productivity (lbs./Acre)
87	CPY7 CP-S3-12	P7 P4	70-90	Ponderosa pine	40-70	Manzanita Bitterbrush Snowbrush	20-50	Sedges Idaho fescue Needlegrass	5-20	Ponderosa pine	65-85	5	0-50
88	CPY9	P9	50-80	Ponderosa pine White fir Douglas-fir Incense cedar	40-70	Manzanita Bitterbrush Snowbrush	10-50	Sedges Idaho fescue Needlegrass	5-20	Ponderosa pine	65-90	4-5	0-50
89	CPY9 NR	P9 NR	0-80	Ponderosa pine Douglas-fir Incense cedar White fir Larch	0-60	Snowbrush Snowberry Manzanita Chinquapin Willow	0-40	Sedges Pinegrass Idaho fescue Forbs	0-20	Variable sites			0-50
90	CTY9 CPY7	P9 P7	70-95	Ponderosa pine Douglas-fir White fir Incense cedar	60-80	Snowbrush Manzanita Bitterbrush Snowberry	20-50	Needlegrass Idaho fescue Pinegrass Forbs	5-20	Ponderosa pine	80-100	4-5	0-100
91	SR-1	S1	50-80	Juniper	0-5	Sagebrush Rabbitbrush Bitterbrush	20-60	Idaho fescue Wheatgrass	10-30	N/A	N/A	N/A	200-500
92	CLY7	L7	60-70	Lodgepole pine Mtn. hemlock	40-70	Reproduction	0-5	Needlegrass	0-2	Low timber site potential			0-50
93	CPY7	P7	70-85	Ponderosa pine	40-70	Manzanita Bitterbrush Snowbrush	30-60	Idaho fescue Sedges Needlegrass	5-20	Ponderosa pine	65-85	5	0-50
94	CL-M4-11	M2	80-95	Lodgepole pine Mtn. hemlock Silver fir Subalpine fir	40-80	Huckleberry	5-40	Sedges Lupine Beargrass	5-20	Lodgepole pine	30-40	5-6	0-50
95	CD-S6-13	W8	80-95	White fir Douglas-fir Lodgepole pine White pine Ponderosa pine	60-90	Snowberry Snowbrush Chinquapin Huckleberry	10-30	Oregon grape Sedges Mosses Forbs	5-30	Douglas-fir	95-120	4-5	0-50
96	CLY5	L5	60-85	Lodgepole pine	40-80	Bitterbrush	10-40	Needlegrass Squirreltail Sedges	1-5	Lodgepole pine	35-45	5	0-50
97	CPY9	P9	60-90	Ponderosa pine Lodgepole pine	50-70	Bitterbrush Manzanita Snowbrush	20-60	Needlegrass Sedges Squirreltail	0-5	Ponderosa pine	75-90	4-5	0-50
98	CW-H1-11	F0	80-95	White fir Douglas-fir Ponderosa pine Sugar pine	60-85	Snowbrush Chinquapin	30-60	Needlegrass Sedges	0-5	White fir Ponderosa pine	45-55 80-100	4 4-5	0-50
1A	NR CMY1	NR M1	10-70	Mtn. hemlock True firs	0-60	Huckleberry	0-30	Sedges Woodrush	0-30	Very low timber site potential			N/A
2A	CRY1 CLY5	R1 L5	30-70	Lodgepole pine Mtn. hemlock	45-70	Huckleberry Currant	5-20	Sedges Needlegrass Pinemat manzanita	0-1	Low timber potential			0-50
2B	CRY1 CLY8	R1 L8	30-75	Lodgepole pine	45-70	Manzanita	0-5	Needlegrass Lupine Pinemat manzanita Sedges	0-5	Lodgepole pine	25-40	5-6	0-50
4A	CLY7	L7	60-75	Lodgepole pine	50-75	Currant	0-5	Lupine Needlegrass	1-15	Lodgepole pine	30-40	5-6	0-100
4C	SD-1	S1	40-70	Juniper	0-2	Sagebrush Rabbitbrush Bitterbrush	30-50	Idaho fescue Cheatgrass Wheatgrass	10-40	N/A	N/A	N/A	200-500
5A	BR CMY1	BF M1	0-75	Mtn. hemlock True firs	0-75	Huckleberry Currant	0-20	Sedges	0-5	Very low timber site potential			0-50
6A	CPY1	P1	60-85	Ponderosa pine	30-60	Bitterbrush Rabbitbrush Manzanita	20-40	Idaho fescue Cheatgrass Squirreltail Needlegrass	20-50	Ponderosa pine	50-70	5-6	100-200
6B	CPY3	P3	70-85	Ponderosa pine Lodgepole pine	60-80	Snowbrush Manzanita Bitterbrush	10-20	Needlegrass Sedges Squirreltail	0-10	Ponderosa pine	70-90	4-5	0-50
6C	SD 1	S1	50-70	Juniper Ponderosa pine	0-5	Sagebrush Bitterbrush	30-50	Idaho fescue	20-50	Very low timber potential			200-500
6E	CLY7	L7	50-75	Lodgepole pine	40-70	Currant	1-10	Lupine Needlegrass	0-10	Lodgepole pine	25-35	6	0-50
6G	CPY1 CP-S2-12	P1 P6	20-60	Ponderosa pine	5-30	Bitterbrush Rabbitbrush	10-40	Needlegrass Idaho fescue Squirreltail	5-20	Ponderosa pine	50-65	6	0-100

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SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

VEGETATION CHARACTERISTICS OF LANDTYPES

Land-type No.	Major Deschutes NF Ecoclass Ident. Codes	Ecoclass Mapping Codes	Total Vegetative Cover %	Overstory		Understory*		Ground Cover		Timber Site Species	Timber Site Index	Cubic Foot Site Class	Range Productivity (lbs./Acre)
				Major Species	Veg. Cover %	Major Species	Veg. Cover %	Major Species	Veg. Cover %				
6H	CW-S1-15	W6	60-90	White fir Lodgepole pine Ponderosa pine	50-85	Currant Snowbrush	5-20	Sedges Lupine	5-15	White fir Lodgepole pine	40-45 35-45	5 5-6	0-50
6J	CPY5 CPY3	P5 P3	70-90	Ponderosa pine Lodgepole pine	50-80	Bitterbrush Lodgepole pine	20-50	Idaho fescue Needlegrass Sedges	10-20	Ponderosa pine Lodgepole pine	65-80 40-50	5 5	0-100
7A	CLY6 CLY7	L6 L7	50-75	Lodgepole pine Mtn. hemlock	50-70	Currant	0-5	Needlegrass Lupine	0-5	Very low timber site potential			0-50
7B	CLY6 CMY1	L6 M1	50-75	Lodgepole pine Mtn. hemlock	50-70	Huckleberry Currant	0-5	Sedges	0-5	Very low timber site potential			0-50
7C	CLY0	L0	5-40	Lodgepole pine	5-30	Sagebrush	5-30	Needlegrass	0-1	Very low timber site potential			0-50
7E	CLY5	L5	50-70	Lodgepole pine	45-70	Bitterbrush Currant	0-10	Needlegrass	0-2	Lodgepole pine	30-35	6	0-50
7F	CLY7 CLY6 CMY1	L7 L6 M1	50-75	Lodgepole pine Mtn. hemlock	50-70	Huckleberry Currant	0-10	Sedges Needlegrass Lupine	0-10	Low timber site potential			0-50
7G	CRY1	R1	40-70	Lodgepole pine Mtn. hemlock	40-70	Manzanita	0-5	Needlegrass Pinemat manzanita	0-5	Very low timber site potential			0-50
7H	CPY1 CPY8	P1 P8	60-80	Ponderosa pine	40-70	Bitterbrush Goldenweed Sagebrush	0-10	Idaho fescue Lupine Wheatgrass	5-30	Ponderosa pine	60-75	5-6	100-200
7J	CLY0	L0	20-60	Lodgepole pine	20-50	Sagebrush	20-50	Needlegrass Idaho fescue	0-10	Very low timber site potential			0-50
7K	CPY8 CRY1	P8 P1	50-75	Ponderosa pine	20-50	Bitterbrush Sagebrush Manzanita	20-50	Idaho fescue	20-40	Ponderosa pine	40-65	6	100-200
7T	SD-1	S1	30-60	None	N/A	Sagebrush	5-30	Idaho fescue Wheatgrass Buckwheat	20-60	N/A	N/A	N/A	100-500
8A	CRY1 CW-S1-15 CWY1 CMY1	R1 W6 W1 M1	80-95	Mtn. hemlock Shasta red fir Lodgepole pine White pine	70-90	Snowbrush Manzanita	5-15	Princess pine Sedges Needlegrass Mosses	0-5	Lodgepole pine	20-30	6	0-50
8B	CRY1 CW-S1-15 CWY1 CRY1	R1 W6 W1 M1	80-95	Mtn. hemlock Shasta red fir Lodgepole pine White pine	70-90	Snowbrush Manzanita	5-15	Princess pine Sedges Needlegrass Mosses	0-5	Lodgepole pine	20-30	6	0-50
8C	CRY1 CMY1	R1 M1	50-80	White fir Lodgepole pine Ponderosa pine Mtn. hemlock	40-60	Manzanita	0-10	Sedges Needlegrass	0-5	Very low timber site potential			0-50
8E	CRY1 CMY1	R1 M1	10-60	Lodgepole pine	10-60	Manzanita	0-2	Needlegrass Pinemat manzanita	0-5	Very low timber site potential			0-50
8F	CMY1	M1	50-80	Mtn. hemlock Lodgepole pine	50-80	Huckleberry	0-5	Needlegrass Pinemat manzanita	0-10	Very low timber site potential			0-50
8T	CRY1 CPY8 (Variable)	R1 P8	30-75	Varies with elevation	20-70	Varies with elevation	0-50	Varies with elevation	0-40	Very low timber site potential			0-200
9A	CW-M1-11	P0	75-90	White fir Douglas-fir Ponderosa pine Lodgepole pine Sugar pine	60-80	Snowbrush Chinquapin	30-60	Sedges	0-5	Ponderosa pine White fir	80-100 45-55	4-5 4	0-50
9B	CRY1 CMY1	R1 M1	70-90	Lodgepole pine True firs Mtn. hemlock White pine	60-80	Snowbrush Huckleberry	10-60	Princess pine Mosses Sedges	0-10	Low timber site potential			0-50
9C	CPY2 CW-M1-11	P2 P0	60-90	Ponderosa pine	50-70	Manzanita Bitterbrush Snowbrush	20-50	Needlegrass Sedges	0-5	Ponderosa pine	70-90	4-5	0-50
9F	CPY5	P5	60-80	Ponderosa pine Lodgepole pine	50-70	Manzanita Bitterbrush	20-50	Needlegrass Sedges Squirreltail	0-10	Ponderosa pine	70-90	4-5	0-50
9G	CW-G2-11 CW-M1-11	W3 P0	70-95	White fir Ponderosa pine Lodgepole pine Douglas-fir Shasta fir	60-75	Snowbrush Chinquapin Manzanita	40-60	Sedges Bracken fern Princess pine	0-5	Ponderosa pine White fir	75-100 45-50	4-5 4	0-50
9J	CD-S1-15	W6	70-95	Douglas-fir Shasta fir Lodgepole pine Ponderosa pine White pine	60-75	Snowbrush Chinquapin	20-60	Sedges Needlegrass Forbs	0-10	Ponderosa pine	75-95	4-5	0-50

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SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

VEGETATION CHARACTERISTICS OF LANDTYPES

Land-type No.	Major Deschutes NF Ecoclass Ident. Codes	Ecoclass Mapping Codes	Total Vegetative Cover %	Overstory		Understory*		Ground Cover		Timber Site Species	Timber Site Index	Cubic Foot Site Class	Range Productivity (lbs./Acre)
				Major Species	Veg. Cover %	Major Species	Veg. Cover %	Major Species	Veg. Cover %				
9K	CRY1	R1	50-80	Lodgepole pine Mtn. hemlock	50-70	Currant	0-5	Sedges Needlegrass	0-5	Low timber site potential			0-50
9L	CPY5	P5	60-90	Ponderosa pine Lodgepole pine	40-70	Bitterbrush Manzanita	30-60	Needlegrass Squirreltail Sedges	0-5	Ponderosa pine	65-80	5	0-50
9M	CPY2 CW-S1-15 CW-M1-11	P2 W6 P0	70-95	Ponderosa pine Douglas-fir White fir Sugar pine Lodgepole pine	60-80	Snowbrush Chinquapin Manzanita	30-60	Needlegrass Sedges Squirreltail	0-5	Ponderosa pine	75-95	4-5	0-50
9N	CW-M1-11 CW-S1-15	P0 W6	70-95	Douglas-fir White fir Ponderosa pine Shasta red fir	60-80	Snowbrush Chinquapin	30-50	Sedges Needlegrass Princess pine	0-10	Ponderosa pine	75-95	4-5	0-50
9P	CD-S1-15 CMY1 CRY1	W6 M1 R1	70-95	Douglas-fir White fir Shasta red fir Mtn. hemlock	60-80	Snowbrush Huckleberry Willow Currant	10-40	Sedges Forbs Princess pine Mosses	0-10	Site quality is variable, but generally low			0-50
9R	CPY2 CP-S3-12	P2 P4	60-90	Ponderosa pine Lodgepole pine	40-70	Manzanita Bitterbrush	20-50	Sedges Needlegrass Forbs	0-5	Ponderosa pine	65-85	5	0-50
9S	CPY2 CP-S3-12	P2 P4	60-90	Ponderosa pine Lodgepole pine	40-70	Manzanita Bitterbrush	20-50	Needlegrass Sedges Forbs	0-5	Ponderosa pine	65-85	5	0-50
9T	CPY2 CW-M1-11	P2 P0	60-90	Ponderosa pine Lodgepole pine Sugar pine	40-80	Manzanita Snowbrush Bitterbrush	30-60	Sedges Needlegrass Forbs	0-5	Ponderosa pine	65-90	4-5	0-50
9U	CL-S2-16 CP-S2-18	L9 PN	50-70	Lodgepole pine Ponderosa pine	40-70	Bitterbrush Currant	5-20	Needlegrass Squirreltail	0-2	Lodgepole pine	30-40	5-6	0-50
9V	CP-S2-18 CL-S2-16	PN L9	40-75	Lodgepole pine Ponderosa pine	40-60	Bitterbrush Currant	2-10	Needlegrass	0-2	Low timber site potential			0-50
9W	CRY1 CLY7	R1 L7	60-80	Lodgepole pine Mtn. hemlock True firs	50-70	Currant	5-20	Lupine Pinemat manzanita Needlegrass Sedges	0-10	Lodgepole pine	20-35	6	0-50
9X	CP-S2-18 CL-S2-16	PN L9	50-80	Lodgepole pine White fir Ponderosa pine	50-70	Bitterbrush Currant	0-10	Needlegrass Sedges Lupine Squirreltail	0-5	Lodgepole pine	30-40	5-6	0-50
9Y	CRY1 CMY1	R1 M1	70-85	Mtn. hemlock True firs	50-80	Huckleberry	5-20	Needlegrass Pinemat manzanita Sedges Lupine Mosses	0-10	Low timber site potential			0-50
9Z	CW-M1-11	P0	60-85	White fir Douglas-fir Ponderosa pine	50-70	Snowbrush Chinquapin	20-60	Sedges Needlegrass	0-5	Ponderosa pine	80-100	4-5	0-50

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SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART I

Land-type No. 1/	Location of Modal Site	Depth to Bedrock (Inches)	Depth to Restrictive Layer (Inches)	Litter (Inches)	Soil Layer and Thickness (Inches)	Color (Moist)	Texture	Rock Fragments: Size	Rock Fragments: Shape	Rock Fragments: %	Rock Fragment Class
16	SW¼,NE¼, Sec. 30, T.19S.,R.8E.	> 60	35	1.5	1. 0-2	Grayish brown	Sandy loam	Gravel	Subrounded	2	N/A
					2. 2-30	Brown to yellowish brown	Loamy sand	Gravel	Subrounded	5	N/A
					3. 30-35	Dark grayish brown	Sandy loam	Gravel, cobbles, and stones	Subrounded	20	N/A
					4. 35-40+	Dark grayish brown	Cobbly sandy loam	Gravel, cobbles, and stones	Subrounded	40	Cobbly
17	SE¼,NW¼, Sec. 8, T.19S.,R.8E.	> 60	36	0.5	1. 0-28	Brown to yellowish brown	Loamy sand	Gravel	Subrounded	5	N/A
					2. 28-36	Brown	Sandy loam	Gravel, cobbles, and stones	Subrounded	25	N/A
					3. 36-40+	Dark grayish brown	Cobbly sandy loam	Gravel, cobbles, and stones	Subrounded	45	Cobbly
19	NW¼,NW¼, Sec. 28, T.17S.,R.10E.	> 50	50	0-1	1. 0-8	Dark brown	Loamy sand	Gravel	Subrounded	5	N/A
					2. 8-26	Dark brown to brown	Loamy sand	Gravel	Subrounded	5	N/A
					3. 26-40	Dark yellowish brown	Cobbly sandy loam	Cobbles	Subrounded	40	Cobbly
					4. 40-50+	Dark brown	Very cobbly sandy loam	Cobbles and stones	Subrounded	55	Very cobbly
21	NE¼,SE¼, Sec. 17, T.16S.,R.9E.	> 60	48	0.5	1. 0-5	Dark brown	Loamy sand	Gravel	Subrounded	5	N/A
					2. 5-35	Dark yellowish brown	Loamy sand	Gravel	Subrounded	5	N/A
					3. 35-48	Dark yellowish brown	Cobbly loamy sand	Gravel, cobbles, and stones	Subrounded	30	Cobbly
					4. 48-60+	Grayish brown	Very cobbly loamy sand	Gravel, cobbles, and stones	Subrounded	60	Very cobbly
22	SE¼,NW¼, Sec. 25, T.12S.,R.8E.	> 50	40	1.5	1. 0-30	Very dark grayish brown	Sandy loam to loamy sand	Gravel	Subrounded	5	N/A
					2. 30-40	Strong brown	Sandy loam to loamy sand	Gravel, cobbles, and stones	Subrounded	20	N/A
					3. 40-50+	Grayish brown	Very cobbly sandy loam	Gravel, cobbles, and stones	Subrounded	70	Very cobbly
23	SW¼,NE¼, Sec. 29, T.13S.,R.8E.	> 60	50	2.0	1. 0-15	Very dark grayish brown	Loamy sand	N/A	N/A	0	N/A
					2. 15-40	Black	Sand	N/A	N/A	0	N/A
					3. 40-50	Dark brown	Sandy loam	Gravel, cobbles, and stones	Subrounded	30	N/A
					4. 50-60+	Dark grayish brown	Very cobbly sandy loam	Gravel, cobbles, and stones	Subrounded	60	Very cobbly
24	NE¼,SE¼, Sec. 28, T.12S.,R.8E.	> 50	40	1.5	1. 0-30	Dark brown	Loamy sand	Gravel	Subangular	2	N/A
					2. 30-40	Dark yellowish brown	Sandy loam	Gravel, cobbles, and stones	Subrounded and rounded	30	N/A
					3. 40-50+	Dark grayish brown	Cobbly sandy loam	Gravel, cobbles, and stones	Subrounded	50	Cobbly
25	NW¼,NW¼, Sec. 27, T.18S.,R.10E.	> 60	50	1.5	1. 0-25	Dark yellowish brown	Loamy sand	Gravel	Subrounded and irregular	8	N/A
					2. 25-50	Dark yellowish brown	Cobbly sandy loam	Gravel, cobbles, and stones	Subrounded	35	Cobbly
					3. 50-60	Very dark grayish brown	Very cobbly sandy loam	Gravel, cobbles, and stones	Subrounded	60	Very cobbly
26	NW¼,SE¼, Sec. 3, T.18S.,R.10E.	> 60	> 60	1.0	1. 0-15	Dark brown	Sandy loam to loamy sand	Gravel	Subrounded	8	N/A
					2. 15-28	Yellowish brown	Loamy sand	Gravel	Subrounded	15	N/A
					3. 28-60	Dark yellowish brown	Very cobbly sandy loam	Cobbles, stones, and gravel	Subrounded	60	Very cobbly
27	NE¼,NW¼, Sec. 24, T.12S.,R.8E.	> 40	> 40	1.0	1. 0-16	Very dark grayish brown	Sandy loam	Gravel and cobbles	Subrounded and subangular	10	N/A
					2. 16-28	Dark brown	Loam	Gravel, cobbles, and stones	Subrounded	25	N/A
					3. 28-40+	Dark brown	Stony loam	Gravel, cobbles, and stones	Subrounded	40	Stony

1/ Miscellaneous landtypes are not included.

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART II

Land-type No.	Structure: Grade	Structure: Size	Structure: Type	Cementation or Compaction	Permeability	Consistence: Dry	Consistence: Moist	Consistence: Wet	pH	Estimated Taxonomic Classification
16	Weak	Fine	Crumb	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	5.9	Entic Cryorthods, ashy over loamy-skeletal, mixed family
	N/A	N/A	Single grain to massive	None	Rapid	Loose	Very friable	Nonsticky, nonplastic	6.4	
	N/A	N/A	Massive	Slight	Rapid	Slightly hard	Firm	Slightly sticky, nonplastic	6.5	
	N/A	N/A	Massive	Moderate to strong	Moderate to slow	Hard	Firm	Slightly sticky, nonplastic	6.5	
17	N/A	N/A	Single grain to massive	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.4	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Massive	Slight	Moderate	Slightly hard	Firm	Nonsticky, slightly plastic	6.5	
	N/A	N/A	Massive	Moderate	Moderate to slow	Hard	Firm	Nonsticky, slightly plastic	6.5	
19	Weak	Fine	Crumb	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.0	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Massive	None	Rapid	Loose	Loose	Nonsticky, nonplastic	6.7	
	N/A	N/A	Massive	None	Moderate	Soft	Friable	Slightly sticky, slightly plastic	6.5	
	N/A	N/A	Massive	Moderate	Slow to moderate	Hard	Firm	Slightly sticky, slightly plastic	6.5	
21	Weak	Fine	Subangular blocky	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	Entic Cryandepts, medial over loamy-skeletal, mixed family
	N/A	N/A	Massive	None	Rapid	Soft	Loose	Nonsticky, nonplastic	7.0	
	N/A	N/A	Massive	None	Rapid	Soft	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	Moderate	Moderate to slow	Slightly hard	Firm	Slightly sticky, slightly plastic	6.5	
22	Weak	Fine	Crumb	None	Rapid	Soft	Very friable	Slightly sticky, slightly plastic	6.5	Entic Cryandepts, ashy over loamy-skeletal, mixed family
	N/A	N/A	Massive	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.6	
	N/A	N/A	Massive	Strong to moderate	Slow	Very hard to extremely hard	Very firm to extremely firm	Slightly sticky, slightly plastic	6.5	
23	Weak	Fine	Crumb	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.3	Typic Cryandepts, ashy over loamy-skeletal, mixed family
	N/A	N/A	Single grain	None	Rapid	Loose	Loose	Nonsticky, nonplastic	6.6	
	N/A	N/A	Massive	None	Moderate	Slightly hard	Friable	Slightly sticky, slightly plastic	6.5	
	N/A	N/A	Massive	Moderate	Moderate to slow	Hard	Firm	Nonsticky, nonplastic	6.5	
24	Weak	Fine	Crumb	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.4	Entic Cryandepts, medial over loamy-skeletal, mixed family
	N/A	N/A	Massive	None	Moderate to rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.5	
	N/A	N/A	Massive	Moderate	Moderate to slow	Hard	Firm	Slightly sticky, slightly plastic	6.5	
25	N/A	N/A	Massive to single grain	None	Very rapid	Soft to loose	Very friable	Nonsticky, nonplastic	6.5	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Massive	None	Rapid to moderate	Slightly hard	Friable	Slightly sticky, slightly plastic	6.5	
	N/A	N/A	Massive	Moderate	Moderate to slow	Hard	Firm	Slightly sticky, slightly plastic	6.4	
26	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Massive	None	Rapid to very rapid	Soft	Very friable	Nonsticky, nonplastic	6.7	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.5	
27	Weak	Medium	Crumb to massive	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	Entic Cryandepts, ashy over loamy-skeletal, mixed family
	N/A	N/A	Massive	None	Moderate	Slightly hard	Friable to firm	Slightly sticky, slightly plastic	6.4	
	N/A	N/A	Massive	Slight to moderate	Moderate	Slightly hard to hard	Firm	Slightly sticky, slightly plastic	6.4	

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART I

Land-type No. 1/	Location of Modal Site	Depth to Bedrock (Inches)	Depth to Restrictive Layer (Inches)	Litter (Inches)	Soil Layer and Thickness (Inches)	Color (Moist)	Texture	Rock Fragments			Rock Fragment Class
								Size	Shape	%	
28	NEk,NEk, Sec. 26, T.14S.,R.8E.	> 50	50	1.5	1. 0-15	Dark brown	Loamy sand to sandy loam	Gravel	Subangular	5	N/A
					2. 15-27	Yellowish brown	Loamy sand	Gravel	Subangular	10	N/A
					3. 27-50	Yellowish brown	Cobbly sandy loam	Gravel and cobbles	Subrounded	50	Cobbly
					4. 50-60+	Grayish brown	Very cobbly sandy loam	Gravel, cobbles, and stones	Subrounded	70	Very cobbly
29	NWk, NEk, Sec. 16, T.13S.,R.9E.	> 60	50	1.0	1. 0-26	Dark grayish brown	Loamy sand	Gravel	Subangular	3	N/A
					2. 26-50	Dark yellowish brown	Sandy loam to loamy fine sand	Gravel, cobbles, and stones	Subrounded	20	N/A
					3. 50-60+	Grayish brown	Very cobbly sandy loam	Gravel, cobbles, and stones	Subrounded	60	Very cobbly
30	SWk,SEk, Sec. 7, T.12S.,R.9E.	> 36	28	1.5	1. 0-15	Dark grayish brown	Sandy loam	Gravel and cobbles	Rounded	10	N/A
					2. 15-28	Dark yellowish brown	Cobbly sandy loam	Gravel, cobbles, and stones	Rounded	35	Cobbly
					3. 28-36+	Grayish brown	Very cobbly sandy loam	Gravel, cobbles, and stones	Rounded	60	Very cobbly
31	SWc,SWc, Sec. 17, T.23S.,R.6E.	> 62	62	2.0	1. 0-10	Dark grayish brown to yellowish brown	Gravelly loamy coarse sand	Gravel	Granular pumice	35	Gravelly
					2. 10-28	Yellowish red and light brown	Very gravelly coarse sand	Gravel	Gravel	70	Very gravelly
					3. 28-42	Brownish yellow	Coarse sand	Gravel	Gravel	30	N/A
					4. 42-62+	Dark yellowish brown	Very cobbly sandy loam	Cobbles, stones, and gravel	Subrounded	60	Very cobbly
32	NEk,SWk, Sec. 11, T.16S.,R.9E.	> 40	> 40	1.5	1. 0-14	Dark brown	Loamy sand	Gravel	Subrounded	8	N/A
					2. 14-32	Brown	Cobbly loamy sand	Gravel and cobbles	Subrounded	40	Cobbly
					3. 32-40+	Brown	Very cobbly sandy loam	Gravel, cobbles, and stones	Subrounded	60	Very cobbly
33	SEk,SEk, Sec. 25, T.23S.,R.8E.	> 75	> 75 Minor restriction at 40	2.0	1. 0-40	Grayish brown	Very gravelly sand	Gravel	Irregular and granular cinders	70	Very gravelly
					2. 40-65	Brown	Loamy fine sand	Gravel	Irregular and granular cinders	4	N/A
					3. 65-75+	Yellowish brown	Cobbly sandy loam	Gravel, cobbles, and stones	Subrounded	40	Cobbly
34	NEk,SWk, Sec. 26, T.13S.,R.8E.	> 72	> 72	2.0	1. 0-50	Grayish brown	Very gravelly sand	Gravel	Irregular and granular cinders	75	Very gravelly
					2. 50-68	Brown	Loamy sand	Gravel	Granular cinders	5	N/A
					3. 68-72	Yellowish brown	Cobbly sandy loam	Gravel, cobbles, and stones	Subrounded and rounded	50	Cobbly
35	SWk,SWk, Sec. 25, T.21S.,R.11E.	> 50	> 50	1.0	1. 0-8	Dark yellowish brown	Loamy sand	Gravel	Granular pumice	5	N/A
					2. 8-30	Yellowish brown	Loamy sand and sand	Gravel	Granular pumice	10	N/A
					3. 30-42	Brown	Sandy loam	Gravel	Rounded	15	N/A
					4. 42-50+	Brown	Gravelly loamy sand	Gravel	Rounded	45	Gravelly
36	SWk,NWk, Sec. 12, T.16S.,R.10E.	> 44	> 44	0.5	1. 0-10	Brown	Loamy sand	Gravel	Subrounded	5	N/A
					2. 10-38	Brown	Loamy sand	Gravel and cobbles	Subrounded	30	N/A
					3. 38-44+	Grayish brown	Very gravelly loamy sand	Cobbles and gravel	Subrounded	50	Very gravelly
37	SWk,SWk, Sec. 23, T.14S.,R.9E.	> 94	54	0.5	1. 0-40	Dark yellowish brown	Loamy sand to fine sand	Gravel	Subrounded	10	N/A
					2. 40-64	Yellowish brown	Gravelly sandy loam	Gravel and cobbles	Subrounded	40	Gravelly
					3. 64-94+	Dark grayish brown	Very gravelly sand	Gravel and cobbles	Subrounded	85	Very gravelly
38	WWk,SWk, Sec. 31, T.21S.,R.12E.	> 60	> 60	1.5	1. 0-12	Dark yellowish brown	Loamy sand	Gravel	Granular pumice	8	N/A
					2. 12-26	Yellowish brown	Loamy sand and sand	Gravel	Granular pumice	10	N/A
					3. 26-30	Brown	Sandy loam	Gravel	Rounded	20	N/A
					4. 30-60+	Olive brown	Loamy sand	Gravel	Rounded	45	Gravelly

1/ Miscellaneous landtypes are not included.

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART II

Land-type No.	Structure			Cementation or Compaction	Permeability	Consistence			pH	Estimated Taxonomic Classification
	Grade	Size	Type			Dry	Moist	Wet		
28	Weak	Fine	Crumb	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.4	Entic Cryandepts, ashy over loamy-skeletal, mixed family
	N/A	N/A	Massive	None	Rapid	Soft to loose	Very friable	Nonsticky, nonplastic	6.4	
	N/A	N/A	Massive	None	Rapid	Soft	Friable	Slightly sticky, slightly plastic	6.5	
	N/A	N/A	Massive	Moderate to strong	Moderate to slow	Hard to very hard	Firm to very firm	Slightly sticky, slightly plastic	6.5	
29	Weak	Fine	Crumb	None	Rapid	Soft	Very friable to loose	Nonsticky, nonplastic	6.4	Typic Cryandepts, ashy over coarse-loamy, mixed family
	N/A	N/A	Massive to single grain	None	Rapid	Soft to slightly hard	Friable	Slightly sticky, slightly plastic	6.6	
	N/A	N/A	Massive	Moderate	Moderate	Hard	Firm	Slightly sticky, slightly plastic	6.6	
30	Weak	Medium	Granular	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.2	Typic Cryofluvents, medial over loamy-skeletal, mixed family
	N/A	N/A	Massive	Slight	Moderate	Slightly hard	Friable	Slightly sticky, slightly plastic	6.5	
	N/A	N/A	Massive	Moderate	Moderate	Hard	Firm	Slightly sticky, slightly plastic	6.5	
31	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	5.8	Entic Cryorthods, cindery family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.3	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.4	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.4	
32	Weak	Fine	Crumb	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.3	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Massive	None	Rapid to moderate	Soft	Very friable	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Moderate	Slightly hard	Friable	Slightly sticky, slightly plastic	6.8	
35	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.0	Typic Cryorthents, cindery family
	N/A	N/A	Massive	None to slight	Moderate to rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.4	
	N/A	N/A	Massive	None	Moderate	Slightly hard	Friable	Slightly sticky, slightly plastic	6.5	
34	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.0	Typic Cryorthents, cindery family
	N/A	N/A	Massive	None	Rapid	Slightly hard to soft	Friable	Nonsticky, nonplastic	6.4	
	N/A	N/A	Massive	None to slight	Rapid to moderate	Slightly hard	Friable	Slightly sticky, slightly plastic	6.5	
35	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.6	Typic Cryorthents, ashy over coarse-loamy, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.9	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, nonplastic	6.5	
	N/A	N/A	Massive	Slight	Rapid	Slightly hard	Firm	Nonsticky, nonplastic	6.8	
36	Weak	Fine	Granular	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.8	Typic Xerorthents, medial over loamy-skeletal, mixed, mesic family
	N/A	N/A	Massive	None	Rapid	Loose	Very friable	Nonsticky, nonplastic	7.6	
	N/A	N/A	Massive	Slight	Rapid	Slightly hard	Friable to firm	Nonsticky, nonplastic	7.5	
37	Massive to single grain	N/A	N/A	None	Very rapid	Soft to loose	Very friable	Nonsticky, nonplastic	6.8	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	Massive	N/A	N/A	None	Rapid	Soft	Friable	Slightly sticky, slightly plastic	6.8	
	Massive	N/A	N/A	Moderate to strong	Moderate to slow	Hard	Firm	Nonsticky, nonplastic	6.8	
38	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.8	Typic Cryorthents, ashy over coarse-loamy, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, nonplastic	6.5	
	N/A	N/A	Massive	Slight to moderate	Moderate to rapid	Slightly hard to hard	Firm	Nonsticky, nonplastic	6.8	

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART I

Land-type No. 1/	Location of Modal Site	Depth to Bedrock (Inches)	Depth to Restrictive Layer (Inches)	Litter (Inches)	Soil Layer and Thickness (Inches)	Color (Moist)	Texture	Rock Fragments: Size	Shape	%	Rock Fragment Class
39	SWc,SWc, Sec. 14 T.13S.,R.9E.	>55	>55	1.0	1. 0-40	Dark brown	Sandy loam	Gravel	Rounded	5	N/A
					2. 40-55+	Dark brown to brown	Gravelly loam	Gravel	Rounded	5	N/A
40	SWc,SEc, Sec. 4, T.13S.,R.9E.	>46	40 (Watertable)	1.0	1. 0-36	Dark grayish brown	Sandy loam	Gravel	Subround	10	N/A
					2. 36-46+	Grayish brown	Loam	Gravel	Subround	20	N/A
41	SWc,NEc, Sec. 35, T.21S.,R.11E.	>50	>50	1.3	1. 0-10	Dark brown to dark yellowish brown	Loamy sand	Gravel	Granular pumice	5	N/A
					2. 10-28	Yellowish brown	Loamy coarse sand and sand	Gravel	Granular pumice	10	N/A
					3. 28-45	Brown to dark brown	Sandy loam	Gravel	Rounded	10	N/A
					4. 45-50+	Brown to dark brown	Gravelly loamy sand	Gravel	Rounded	40	Gravelly
42	NWc,SWc, Sec. 30, T.21S.,R.12E.	>84	52	1.5	1. 0-24	Yellowish brown	Loamy sand and sand	Gravel	Granular pumice	3	N/A
					2. 24-52	Dark brown	Sandy loam	Gravel	Granular pumice	5	N/A
					3. 52-84+	Olive brown	Gravelly loamy sand and sand	Gravel	Subround	50	Gravelly
43	SEk,SEk, Sec. 1, T.20S.,R.10E.	>24	22 (Watertable)	1.0	1. 0-17	Very dark gray	Coarse sandy loam	Gravel	Subrounded and granular pumice	5	N/A
					2. 17-24	Brown	Loamy coarse sand	Gravel	Subrounded and granular pumice	5	N/A
44	SEk,SEk, Sec. 4, T.20S.,R.10E.	>48	43 (Watertable)	1.0	1. 0-40	Dark brown to brown	Loamy sand	Gravel	Granular pumice	5	N/A
					2. 40-48	Dark grayish brown	Gravelly loamy coarse sand	Gravel	Subrounded	50	Gravelly
45	SEk,SEk, Sec. 20, T.21S.,R.9E.	>45	>45	1.0	1. 0-36	Yellowish brown	Loamy coarse sand	Gravel	Granular pumice	10	N/A
					2. 36-45+	Yellowish brown	Sandy loam	Gravel	Subrounded	25	N/A
46	SEk,SWk, Sec. ., T.22S.,R.7E.	>50	>50	0.8	1. 0-2	Dark brown	Loamy sand	Gravel	Granular pumice	2	N/A
					2. 2-14	Brown	Loamy coarse sand	Gravel	Granular pumice	3	N/A
					3. 14-23	Reddish yellow	Loamy sand	Gravel	Granular pumice	30	N/A
					4. 23-32	Very pale brown	Coarse sand	Gravel	Granular pumice	2	N/A
					5. 32-45	Brown	Fine sandy loam	Gravel	Rounded	20	N/A
					6. 45-50+	Brown	Gravelly loamy sand	Gravel	Rounded	50	Gravelly
47	SWc,NWc, Sec. 29, T.22S.,R.14E.	>30	>30	0.5	1. 0-10	Brown and dark brown	Loamy sand	Gravel	Granular pumice	5	N/A
					2. 10-22	Yellowish brown and pale brown	Loamy sand and sand	Gravel	Granular pumice	5	N/A
					3. 22-30+	Dark brown	Gravelly sandy loam	Gravel	Rounded	45	Gravelly
48	NEk,SEk, Sec. 36, T.19S.,R.13E.	>70	>70	0-0.2	1. 0-8	Very dark grayish brown	Sandy loam	Gravel	Rounded	15	N/A
					2. 8-35	Dark grayish brown	Loamy sand	Gravel	Rounded	25	N/A
					3. 35-60+	Dark yellowish brown	Gravelly sand	Gravel	Rounded	40	Gravelly
49	NEk,SEk, Sec. 24, T.19S.,R.13E.	>60	>60	0-0.3	1. 0-5	Very dark grayish brown	Sandy loam	Gravel	Rounded	15	N/A
					2. 5-30	Dark grayish brown	Loamy sand	Gravel	Rounded	25	N/A
					3. 30-60+	Dark yellowish brown	Gravelly sand	Gravel	Rounded	45	Gravelly
50	SEk,NWk, Sec. 4, T.12S.,R.11E.	23	22	0.5	1. 0-3	Black	Sandy loam	Gravel	Angular and subangular	20	N/A
					2. 3-17	Very dark grayish brown	Sandy loam to loam	Gravel	Angular and subangular	25	N/A
					3. 17-23	Dark brown	Very cobbly loam	Gravel	Angular	60	Very cobbly

1/ Miscellaneous landtypes are not included.

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART II

Land-type No.	Structure: Grade	Structure: Size	Structure: Type	Cementation Compaction	Permeability	Consistence: Dry	Consistence: Moist	Consistence: Wet	pH	Estimated Taxonomic Classification
39	Weak	Fine	Crumb to massive	None	Rapid	Soft	Very friable	Slightly sticky, slightly plastic	6.8	Andeptic Cryofluvents, medial over loamy-skeletal, mixed family
	N/A	N/A	Massive	None	Moderate	Hard	Friable to firm	Sticky, plastic	7.1	
40	Weak	Fine	Subangular blocky to massive	None	Rapid	Soft	Very friable	Slightly sticky, slightly plastic	6.8	Aquic Cryofluvents, medial over loamy, mixed family
	N/A	N/A	Massive	None	Moderate	Slightly hard	Friable	Sticky, plastic	6.6	
41	Weak	Fine	Granular and massive	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.7	Typic Cryorthents, ashy over coarse loamy, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	7.0	
	N/A	N/A	Massive	Slight	Rapid	Slightly hard	Firm	Slightly sticky, slightly plastic	6.5	
	N/A	N/A	Massive to single grain	Slight	Rapid	Slightly hard	Firm	Nonsticky, nonplastic	6.8	
42	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	Typic Cryorthents, ashy over coarse-loamy, mixed family
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, nonplastic	6.5	
	N/A	N/A	Massive	Moderate	Moderate to rapid	Hard	Firm	Nonsticky, nonplastic	6.9	
43	Weak	Fine	Granular to massive	None	Very rapid	Soft	Very friable	Slightly sticky, nonplastic	6.4	Typic Cryaquents, medial, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.3	
44	N/A	N/A	Massive to single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.2	Aquic Cryorthents, cindery family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.4	
45	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.2	Typic Cryorthents, ashy over coarse-loamy, mixed family
	N/A	N/A	Massive to single grain	None	Rapid	Slightly hard	Friable	Slightly sticky, nonplastic	6.4	
46	Weak	Fine	Granular	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.3	Typic Cryorthents, ashy over coarse-loamy, mixed family
	Weak	Fine	Granular	None	Very rapid	Soft	Loose	Nonsticky, nonplastic	6.3	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.5	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	7.0	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.5	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Nonsticky, nonplastic	6.5	
47	Weak	Fine	Granular	None	Very rapid	Soft	Very friable to loose	Nonsticky, nonplastic	6.8	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Massive	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.9	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	7.0	
48	Weak	Medium	Granular	None	Rapid	Soft	Very friable	Slightly sticky, nonplastic	7.0	Xerric Torriorthents, medial, mixed, mesic family
	N/A	N/A	Massive	None	Very rapid	Loose	Very friable	Nonsticky, nonplastic	7.5	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	8.0	
49	Weak	Medium	Granular	None	Rapid	Soft	Very friable	Slightly sticky, nonplastic	7.0	Xeric Torriorthents, medial over sandy-skeletal, mixed, mesic family
	N/A	N/A	Massive	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	7.5	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	7.9	
50	Moderate	Fine	Granular	None	Rapid	Soft	Very friable	Slightly sticky, slightly plastic	7.0	Lithic Haploxerolls, coarse-loamy over loamy-skeletal, mixed, mesic family
	N/A	N/A	Massive	None	Rapid	Soft	Very friable	Slightly sticky, slightly plastic	7.5	
	N/A	N/A	Massive	None	Moderate	Slightly hard	Friable	Sticky, plastic	7.7	

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART I

Land-type No. 1/	Location of Modal Site	Depth to Bedrock (Inches)	Depth to Restrictive Layer (Inches)	Litter (Inches)	Soil Layer and Thickness (Inches)	Color (Moist)	Texture	Rock Fragments: Size	Rock Fragments: Shape	Rock Fragments: %	Rock Fragment Class
51	SEk,NWk, Sec. 14, T.12S.,R.10E.	26	26	0.5	1. 0-8	Dark brown	Sandy loam	Gravel and cobbles	Platy and irregular	10	N/A
					2. 8-20	Dark brown	Loam to sandy loam	Gravel and cobbles	Platy and irregular	20	N/A
					3. 20-26	Dark brown	Very gravelly	Gravel	Blocky and irregular	60	Very gravelly
52	SWk,NWk, Sec. 23, T.12S.,R.10E.	30	30	2.0	1. 0-12	Dark brown	Loamy fine sand	Gravel and cobbles	Platy and irregular	10	N/A
					2. 12-20	Brown to dark brown	Loam	Gravel and cobbles	Blocky	20	N/A
					3. 20-30	Brown to dark brown	Cobbly	Gravel, cobbles, and stones	Blocky	35	Cobbly
54	SEk,NEk, Sec. 28, T.11S.,R.10E.	30	30	0.8	1. 0-10	Dark brown	Sandy loam	Gravel	Irregular	5	N/A
					2. 10-20	Brown	Loam	Gravel and cobbles	Irregular	15	N/A
					3. 20-30	Yellowish brown	Gravelly loam	Gravel and cobbles	Irregular to blocky	40	Gravelly
55	SEk,SWk, Sec. 14, T.11S.,R.10E.	26	26	0.5	1. 0-8	Dark brown	Sandy loam	Gravel	Blocky and irregular	10	N/A
					2. 8-20	Dark brown	Loam	Gravel and cobbles	Blocky and irregular	15	N/A
					3. 20-26	Brown	Gravelly loam	Gravel and cobbles	Blocky and irregular	45	Gravelly
56	SEk,SEk, Sec. 3, T.12S.,R.11E.	34	34	0.3	1. 0-12	Dark brown to brown	Loamy sand	Gravel	Granular pumice	5	N/A
					2. 12-24	Brown to dark brown	Loamy sand	Gravel	Granular pumice	20	N/A
					3. 24-34	Light reddish brown	Sandy loam	Gravel	Granular pumice	30	N/A
57	NEk,NWk, Sec. 25, T.10S.,R.9E.	36	36	1.0	1. 0-24	Dark brown to brown	Loamy sand	Gravel	Granular pumice	10	N/A
					2. 24-36	Brown	Sandy loam	Gravel	Granular pumice	30	N/A
58	SWk,SEk, Sec. 24, T.10S.,R.9E.	32	32	2.0	1. 0-10	Dark grayish brown	Loamy sand	Gravel	Granular pumice	15	N/A
					2. 10-24	Yellowish brown	Loamy sand	Gravel	Granular pumice	15	N/A
					3. 24-32	Brownish yellow	Sand	Gravel	Irregular	2	N/A
59	SEk,NWk, Sec. 34, T.17S.,R.11E.	30	30	1.0	1. 0-6	Dark brown	Loamy sand	Gravel	Granular pumice	8	N/A
					2. 6-30	Strong brown	Loamy sand	Gravel and cobbles	Irregular and blocky	15	N/A
60	NEk,SWk, Sec. 16, T.14S.,R.10E.	30	30	0.3	1. 0-17	Very dark grayish brown	Sandy loam	Gravel, cobbles, and stones	Blocky	40	Stony
					2. 17-35	Dark brown	Stony sandy loam to loam	Gravel, cobbles, and stones	Blocky	40	Stony
61	SWk,NEk, Sec. 17, T.13S.,R.10E.	32	32	0.5	1. 0-15	Dark brown	Sandy loam	Gravel	Blocky to subrounded	5	N/A
					2. 15-32	Reddish brown	Loam	Gravel, cobbles, and stones	Blocky to subrounded	30	N/A
62	SEk,SEk, Sec. 1, T.12S.,R.9E.	45	45	1.5	1. 0-10	Dark brown	Sandy loam	Gravel and cobbles	Subangular	5	N/A
					2. 10-35	Reddish brown	Loam	Cobbles and stones	Subangular	20	N/A
					3. 35-45	Reddish brown	Stony loam	Cobbles and stones	Subangular	50	Stony
63	NWk,NWk, Sec. 21, T.19S.,R.11E.	36	36	0.5	1. 0-7	Brown	Loamy sand	Gravel	Granular pumice	3	N/A
					2. 7-32	Brown	Loamy sand	Gravel	Granular pumice to subrounded	3	N/A
					3. 32-36	Strong brown	Stony loamy fine sand	Cobbles and stones	Angular blocky	50	Stony
64	NEk,NEk, Sec. 9, T.20S.,R.11E.	45	45	0.8	1. 0-3	Dark brown	Loamy sand	Gravel	Granular pumice	3	N/A
					2. 3-30	Brown to yellowish brown	Loamy coarse sand	Gravel	Granular pumice and blocky	3	N/A
					3. 30-45						

1/ Miscellaneous landtypes are not included.

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART II

Land-type No.	Structure: Grade	Structure: Size	Structure: Type	Cementation or Compaction	Permeability	Consistence: Dry	Consistence: Moist	Consistence: Wet	pH	Estimated Taxonomic Classification
51	Weak	Fine	Crumb	None	Rapid	Soft	Very friable	Slightly sticky, nonplastic	6.8	Andic Xerochrepts, medial over loamy-skeletal, mixed, mesic family
	Moderate	Medium	Subangular block to massive	None	Moderate	Slightly hard	Friable	Sticky, plastic	6.8	
	N/A	N/A	Massive	None	Moderate	Hard	Firm	Sticky, plastic	6.9	
52	Weak	Fine	Crumb	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.8	Andic Cryochrepts, medial over loamy-skeletal, mixed family
	N/A	N/A	Massive	None	Moderate	Slightly hard	Friable	Sticky, plastic	6.8	
	N/A	N/A	Massive	None	Moderate	Slightly hard	Firm	Sticky, plastic	7.0	
54	Weak	Fine	Granular	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.7	Andic Cryochrepts, medial over loamy-skeletal, mixed family
	N/A	N/A	Massive to subangular blocky	None	Moderate	Slightly hard	Friable	Sticky, plastic	6.8	
	N/A	N/A	Massive	None	Moderate	Slightly hard	Friable	Sticky, plastic	7.0	
55	Weak	Medium	Granular	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.9	Andic Xerochrepts, medial over loamy-skeletal, mixed, mesic family
	Weak	Medium	Subangular block to massive	None	Moderate	Slightly hard to hard	Friable	Sticky, plastic	7.0	
	N/A	N/A	Massive	None	Moderate	Slightly hard to hard	Friable	Sticky, plastic	7.0	
56	Weak	Fine	Granular	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.3	Typic Cryorthents, ashy over coarse-loamy, mixed family
	N/A	N/A	Massive	None	Rapid	Soft	Friable	Nonsticky, nonplastic	6.5	
	N/A	N/A	Massive	None	Rapid	Soft	Friable	Nonsticky, nonplastic	6.8	
57	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.4	Typic Cryorthents, ashy over coarse-loamy, mixed family
	N/A	N/A	Massive	None	Rapid	Soft	Very friable	Slightly sticky, nonplastic	6.8	
58	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	Typic Cryorthents, ashy, mixed family
	N/A	N/A	Single grain to massive	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
59	Weak	Fine	Granular	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	Typic Cryorthents, ashy, mixed family
	N/A	N/A	Massive to single grain	None	Very rapid	Loose	Very friable	Nonsticky, nonplastic	6.5	
60	Weak	Fine	Granular	None	Rapid	Soft	Very friable	Slightly sticky, nonplastic	6.7	Typic Haploxerolls, coarse-loamy over loamy-skeletal, mixed, mesic family
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable to firm	Slightly sticky, slightly plastic	6.9	
61	Weak	Moderate	Granular to subangular blocky	None	Rapid	Soft	Friable	Slightly sticky, slightly plastic	6.6	Andic Cryochrepts, medial over loamy, mixed family
	N/A	N/A	Massive	None	Moderate	Slightly hard to hard	Friable to firm	Sticky, plastic	6.8	
62	Weak	Fine	Granular to massive	None	Rapid	Soft	Very friable	Slightly sticky, nonplastic	6.4	Andic Cryochrepts, medial over loamy, mixed family
	Moderate	Medium	Subangular blocky to massive	None	Moderate	Hard	Firm	Sticky, plastic	6.5	
	N/A	N/A	Massive	None	Moderate	Hard	Firm	Sticky, plastic	6.6	
63	N/A	N/A	Massive to single grain	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.2	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.6	
	N/A	N/A	Massive	None	Rapid	Soft	Friable	Nonsticky, nonplastic	6.6	
64	N/A	N/A	Single grain to massive	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.4	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.5	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, nonplastic	6.5	

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART I

Land-type No. 1/	Location of Modal Site	Depth to Bedrock (Inches)	Depth to Restrictive Layer (Inches)	Litter (Inches)	Soil Layer and Thickness (Inches)	Color (Moist)	Texture	Rock Fragments: Size	Shape	%	Rock Fragment Class
65	NWk,SEk, Sec. 20, T.20S.,R.12E.	45	45	2.0	1. 0-2	Dark brown	Loamy sand	Gravel	Granular pumice	5	N/A
					2. 2-8	Brown	Loamy coarse sand	Gravel	Granular pumice	10	N/A
					3. 8-22	Strong brown	Loamy coarse sand	Gravel	Granular pumice	20	N/A
					4. 22-31	Olive yellow	Coarse sand	Gravel	Granular pumice	2	N/A
					5. 31-45	Brown	Very stony sandy loam	Gravel, cobbles, and stones	Blocky	60	Very stony
66	SEk,SWk, Sec. 20, T.20S.,R.10E.	40	40	1.0	1. 0-4	Dark brown	Loamy sand	Gravel	Granular pumice	5	N/A
					2. 4-30	Yellowish brown	Loamy sand and sand	Gravel and stones	Granular pumice and blocky	10	N/A
					3. 30-40	Brown	Cobbly sandy loam	Cobbles and stones	Blocky	35	Cobbly
67	NEk,NWk, Sec. 20, T.21S.,R.8E.	42	42	2.0	1. 0-8	Dark grayish brown	Loamy sand	Gravel	Granular pumice	10	N/A
					2. 8-30	Strong brown	Loamy sand	Gravel	Granular pumice	10	N/A
					3. 30-42	Dark brown	Cobbly sandy loam	Gravel, cobbles, and stones	Blocky	40	Cobbly
68	NWc,NWk, Sec. 16, T.19S.,R.11E.	28	28	0.5	1. 0-3	Dark brown	Loamy sand	Gravel	Granular pumice	10	N/A
					2. 3-20	Yellowish brown	Loamy sand	Gravel, cobbles, and stones	Granular and blocky	10	N/A
					3. 20-28	Dark yellowish brown	Stony sandy loam	Gravel, cobbles, and stones	Blocky and platy	50	Stony
69	NEk,NWk, Sec. 27, T.19S.,R.10E.	40	40	1.5	1. 0-6	Dark grayish brown	Loamy sand	Gravel	Granular pumice	8	N/A
					2. 6-32	Strong brown	Loamy sand and sand	Gravel, cobbles, and stones	Granular and blocky	10	N/A
					3. 32-40	Dark brown	Stony sandy loam	Cobbles and stones	Blocky	35	Stony
70	SEk,NWk, Sec. 15, T.23S.,R.11E.	45	45	0.5	1. 0-3	Very dark grayish brown	Loamy coarse sand	Gravel	Granular pumice	5	N/A
					2. 3-15	Light yellowish brown	Loamy coarse sand	Gravel	Granular pumice	15	N/A
					3. 15-28	Brownish yellow	Loamy coarse sand	Gravel	Granular pumice	30	N/A
					4. 28-34	Very pale brown	Loamy coarse sand	Gravel	Granular pumice	30	N/A
					5. 34-45	Dark yellowish brown	Cobbly loamy sand	Cobbles and stones	Blocky	35	Cobbly
71	NWk,SWk, Sec. 1, T.13S.,R.10E.	26	26	0.8	1. 0-4	Very dark grayish brown	Sandy loam	Gravel, cobbles, and stones	Blocky	10	N/A
					2. 4-15	Brown to dark brown	Sandy loam to loam	Gravel, cobbles, and stones	Blocky	15	N/A
					3. 15-26	Reddish brown	Stony loam	Gravel, cobbles, and stones	Blocky	40	Stony
72	SEk,SWk, Sec. 19, T.22S.,R.16E.	31	31	0.5	1. 0-4	Dark brown	Loamy sand	Gravel	Blocky	2	N/A
					2. 4-14	Dark brown to brown	Loamy sand	Gravel	Blocky	2	N/A
					3. 14-25	Pale brown	Loamy sand	Gravel	Blocky	5	N/A
					4. 25-31	Dark brown	Sandy loam	Cobbles and stones	Blocky	25	N/A
73	SWk,SWc, Sec. 27, T.18S.,R.10E.	36	>36	0.8	1. 0-5	Dark grayish brown	Loamy sand	Gravel	Subangular blocky	2	N/A
					2. 5-28	Yellowish brown	Loamy coarse sand	Gravel	Subangular blocky	2	N/A
					3. 28-36	Dark brown	Stony sandy loam	Cobbles and stones	Subangular and angular blocky	40	Stony
74	NEk,SEc, Sec. 10, T.20S.,R.9E.	27	>27	1.5	1. 0-2	Dark brown	Cobbly loamy sand	Gravel, cobbles, and stones	Angular and sub-angular blocky	45	Cobbly
					2. 2-27	Brown	Very cobbly loamy coarse sand	Gravel, cobbles, and stones	Angular and sub-angular blocky	65	Very stony
75	SEk,NEk, Sec. 5, T.19S.,R.13E.	24	>24	0-0.2	1. 0-3	Black	Cobbly sandy loam	Gravel, cobbles, and stones	Irregular and blocky	40	Cobbly
					2. 3-24	Dark brown	Very cobbly loamy sand	Cobbles and stones	Irregular and blocky	65	Very cobbly

1/ Miscellaneous landtypes are not included.

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART II

Land-type No.	Structure: Grade	Structure: Size	Structure: Type	Consistence: Cementation or Compaction	Consistence: Permeability	Consistence: Dry	Consistence: Moist	Consistence: Wet	pH	Estimated Taxonomic Classification
65	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.2	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Very friable	Nonsticky, nonplastic	6.6	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.9	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	7.0	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.8	
66	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.4	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, nonplastic	6.6	
67	Weak	Fine	Crumb	None	Very rapid	Soft to loose	Very friable	Nonsticky, nonplastic	6.2	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.6	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.5	
68	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Nonsticky, nonplastic	6.8	
69	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.4	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Massive to single grain	None	Very rapid	Loose to soft	Loose	Nonsticky, nonplastic	6.6	
	N/A	N/A	Massive	None	Very rapid	Slightly hard	Friable to firm	Nonsticky, nonplastic	6.5	
70	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.8	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	7.0	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	7.0	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Nonsticky, nonplastic	6.5	
71	Moderate	Medium	Granular	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.8	Andic Xerochrepts, medial over loamy-skeletal, mixed, mesic family
	Weak	Fine	Subangular blocky to massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	7.0	
	Moderate	Medium	Subangular blocky to massive	Weak	Moderate	Hard	Firm	Sticky, plastic	7.0	
72	Weak	Fine	Crumb	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.6	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Single grain to massive	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	
	N/A	N/A	Single grain	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.8	
73	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.2	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Very friable	Nonsticky, nonplastic	7.0	
	N/A	N/A	Massive	None	Rapid	Soft	Friable	Slightly sticky, nonplastic	6.9	
74	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.2	Typic Cryorthents, ashy-skeletal, mixed family
	N/A	N/A	Single grain to massive	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	7.0	
75	Weak	Fine	Granular	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	7.2	Typic Cryorthents, ashy-skeletal, mixed family
	N/A	N/A	Massive to single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	7.0	

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART I

Land-type No. 1/	Location of Modal Site	Depth to Bedrock (Inches)	Depth to Restrictive Layer (Inches)	Litter (Inches)	Soil Layer and Thickness (Inches)	Color (Moist)	Texture	Rock Fragments: Size	Rock Fragments: Shape	Rock Fragments: %	Rock Fragment Class
76	SE¼,SW¼, Sec. 6, T.21S.,R.12E.	36	36	0.5	1. 0-2	Very dark gray	Very cobbly sandy loam	Gravel, cobbles, and stones	Subangular blocky to irregular	60	Very cobbly
					2. 2-15	Strong brown	Very cobbly loamy sand	Gravel, cobbles, and stones	Blocky	70	Very cobbly
					3. 15-29	Very pale brown	Very stony sand	Gravel, cobbles, and stones	Blocky	70	Very stony
					4. 29-38	Dark brown	Very stony loamy sand	Gravel, cobbles, and stones	Blocky	80	Very stony
77	NE¼,NE¼, Sec. 24, T.20S.,R.12E.	30	>30	0.5	1. 0-3	Very dark grayish brown	Cobbly loamy sand	Cobbles and stones	Irregular and blocky	40	Cobbly
					2. 3-30	Light yellowish brown to stony brown	Very stony loamy sand to strong brown	Cobbles and stones	Irregular and blocky	70	Very stony
78	SW¼,SE¼, Sec. 8, T.12S.,R.10E.	32	>32	0.8	1. 0-6	Very dark brown	Sandy loam	Gravel, cobbles, and stones	Subangular blocky and platy	15	N/A
					2. 6-15	Dark brown	Sandy loam	Gravel, cobbles, and stones	Subangular blocky and platy	15	N/A
					3. 15-32	Reddish brown	Cobbly sandy loam to cobbly loam	Cobbles and stones	Subangular blocky and platy	35	Cobbly
79	NE¼,NE¼, Sec. 18, T.12S.,R.10E.	40	40	2.5	1. 0-3	Black	Loamy fine sand	Gravel	Subangular blocky	10	N/A
					2. 3-18	Very dark brown	Loamy fine sand	Gravel	Subangular blocky	20	N/A
					3. 18-40	Dark reddish brown	Cobbly loam	Gravel and cobbles	Subangular blocky	40	Cobbly
80	NE¼,SW¼, Sec. 6, T.19S.,R.13E.	>60	>60	0-0.5	1. 0-2	Very dark gray	Loamy sand	Gravel	Granular to irregular cinders	10	N/A
					2. 2-20	Brown	Gravelly loamy sand	Gravel	Granular cinders	40	Gravelly
					3. 20-60	Dark reddish brown	Very gravelly coarse sand	Gravel	Granular cinders	78	Very gravelly
81	NE¼,NE¼, Sec. 10, T.19S.,R.12E.	>60	>60	0.7	1. 0-3	Very dark gray	Loamy sand	Gravel	Granular to irregular cinders	5	N/A
					2. 3-28	Brown to dark brown	Loamy sand and sand	Gravel	Granular cinders	20	N/A
					3. 28-60	Dark reddish brown	Very gravelly coarse sand	Gravel	Granular cinders	75	Very gravelly
82	SW¼,SE¼, Sec. 17, T.20S.,R.9E.	>60	>60	0.8	1. 0-5	Dark brown	Loamy sand	Gravel	Granular pumice and cinders	2	N/A
					2. 5-26	Yellowish brown	Loamy sand	Gravel	Granular cinders	2	N/A
					3. 26-42	Strong brown	Sandy loam	Gravel	Granular cinders	20	N/A
					4. 42-60+	Reddish brown	Cinder gravel	Gravel	Granular cinders	50	Gravel
83	NW¼,NW¼, Sec. 35, T.18S.,R.9E.	>50	>50	1.0	1. 0-18	Brownish yellow	Loamy sand	Gravel	Granular pumice and cinders	2	N/A
					2. 18-30	Strong brown	Gravelly loamy sand	Gravel	Granular cinders	40	Gravelly
					3. 30-50+	Reddish brown	Very gravelly coarse sand	Gravel and cobbles	Granular cinders	78	Very gravelly
84	SW¼,SW¼, Sec. 29, T.18S.,R.9E.	42	42	1.0	1. 0-3	Gray	Sandy loam	Gravel	Granular pumice	5	N/A
					2. 3-18	Reddish brown	Sandy loam to loamy sand	Gravel	Granular pumice	5	N/A
					3. 18-30	Dark brown	Loamy coarse sand	Gravel	Blocky and irregular	10	N/A
					4. 30-42	Very dark grayish brown	Cobbly loamy sand	Gravel, cobbles, and stones	Blocky and irregular	40	Cobbly
85	SW¼,NE¼, Sec. 2, T.22S.,R.12E.	50	50	2.5	1. 0-2	Grayish brown	Sandy loam	Gravel	Granular pumice	2	N/A
					2. 2-11	Brown	Loamy sand	Gravel	Granular pumice	5	N/A
					3. 11-24	Yellowish brown	Loamy sand	Gravel	Granular pumice	10	N/A
					4. 24-36	Light yellowish brown	Sand	Gravel	Granular pumice	10	N/A
					5. 36-50	Yellowish brown	Cobbly sandy loam	Gravel and cobbles	Irregular to blocky	45	Cobbly
86	SW¼,NW¼, Sec. 27, T.13S.,R.9E.	45	45	1.0	1. 0-20	Very dark gray to black	Sandy loam to loamy sand	Gravel	Subangular blocky	10	N/A
					2. 20-30	Very dark grayish brown	Sandy loam	Gravel and cobbles	Subangular blocky	15	N/A
					3. 30-45	Dark grayish brown	Stony loam	Gravel, cobbles, and stones	Subangular blocky	45	Stony

1/ Miscellaneous landtypes are not included.

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART II

Land-type No.	Structure: Grade	Structure: Size	Structure: Type	Cementation or Compaction	Permeability	Consistence: Dry	Consistence: Moist	Consistence: Wet	pH	Estimated Taxonomic Classification
76	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.0	Typic Cryorthents, ashy-skeletal, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	7.3	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	7.1	
77	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.2	Typic Cryorthents, ashy-skeletal, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
78	Weak	Fine	Granular	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.6	Andic Cryochrepts, medial over loamy-skeletal, mixed family
	Weak	Fine	Crumb to massive	None	Rapid	Soft	Very friable	Slightly sticky, slightly plastic	6.8	
	N/A	N/A	Massive	None	Rapid to moderate	Slightly hard to hard	Firm	Sticky, plastic	6.8	
79	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	Andic Cryochrepts, ashy over loamy-skeletal, mixed family
	N/A	N/A	Massive	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.8	
	Moderate	Medium	Subangular blocky	None	Moderate	Slightly hard to hard	Firm	Sticky, plastic	6.8	
80	Weak	Fine	Granular	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.9	Typic Xerorthents, ashy over cindery, mixed, vesic family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	7.0	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	7.0	
81	Weak	Fine	Granular	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	Typic Cryorthents, ashy over cindery, mixed family
	N/A	N/A	Single grain to massive	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.9	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	7.0	
82	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.3	Typic Cryorthents, ashy over cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.7	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.6	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
83	N/A	N/A	Single grain to massive	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.2	Typic Cryorthents, ashy over cindery, mixed family
	N/A	N/A	Massive	None	Very rapid	Soft	Friable	Slightly sticky, nonplastic	6.6	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
84	N/A	N/A	Massive	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	5.5	Entic Cryorthods, ashy over skeletal, mixed family
	N/A	N/A	Massive	None	Rapid to very rapid	Soft	Friable	Nonsticky, nonplastic	6.0	
	N/A	N/A	Massive to single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.4	
	N/A	N/A	Massive	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	5.5	
85	N/A	N/A	Massive	None	Rapid	Soft	Very friable	Slightly sticky, nonplastic	5.5	Entic Cryorthods, ashy over loamy-skeletal, mixed family
	N/A	N/A	Massive	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	5.8	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	7.0	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	7.0	
	N/A	N/A	Massive	None	Rapid	Soft	Friable	Slightly sticky, nonplastic	6.5	
86	Weak	Fine	Crumb	None	Very rapid	Soft to loose	Very friable to loose	Nonsticky, nonplastic	6.4	Typic Cryandepts, ashy over loamy-skeletal, mixed family
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.5	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Firm	Slightly sticky, slightly plastic	6.5	

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART I

Land-type No. 1/	Location of Modal Site	Depth to Bedrock (Inches)	Depth to Restrictive Layer (Inches)	Litter (Inches)	Soil Layer and Thickness (Inches)	Color (Moist)	Texture	Rock Fragments: Size	Rock Fragments: Shape	Rock Fragments: %	Rock Fragment Class
87	NEk,SEk, Sec. 3, T.14S.,R.9E.	32	32	1.0	1. 0-3	Very dark grayish brown	Loamy sand	Gravel, cobbles, and stones	Subangular blocky	10	N/A
					2. 3-18	Dark yellowish brown	Loamy sand	Gravel, cobbles, and stones	Subangular blocky	20	N/A
					3. 18-32	Dark brown	Very cobbly sandy loam	Gravel, cobbles, and stones	Subangular blocky	60	Very cobbly
90	SEk,SWk, Sec. 2, T.12S.,R.9E.	> 40	> 40	2.0	1. 0-3	Very dark grayish brown	Sandy loam	Gravel	Subangular blocky	2	N/A
					2. 3-15	Dark brown	Sandy loam	Gravel	Blocky	3	N/A
					3. 15-30	Dark yellowish brown	Loam	Gravel and cobbles	Subangular blocky and platy	5	N/A
					4. 30-40	Dark brown	Cobbly sandy loam	Cobbles and stones	Subangular blocky	45	Cobbly
91	NEk,SWk, Sec. 33, T.21S.,R.13E.	28	28	0-0.2	1. 0-9	Very dark grayish brown	Sandy loam	Gravel and cobbles	Platy	30	N/A
					2. 9-24	Dark yellowish brown	Loam	Gravel and cobbles	Platy	60	Very cobbly
					3. 24-28	Dark yellowish brown	Sandy loam	Gravel, cobbles, and stones	Platy	75	Very cobbly
92	NWk,SWk, Sec. 6, T.21S.,R.13E.	> 40	> 40	0-0.2	1. 0-8	Yellowish red	Gravelly loamy sand	Gravel	Granular to irregular cinders	50	Gravelly
					2. 8-20	Reddish brown	Very gravelly coarse sand	Gravel	Granular cinders	75	Very gravelly
					3. 20-40+	Dark reddish brown	Extremely gravelly sand	Gravel	Granular cinders	90	Extremely gravelly
93	NWk,SEk, Sec. 13, T.19S.,R.11E.	> 57	> 57	0.5	1. 0-13	Yellowish brown	Very gravelly sand	Gravel	Granular cinders	70	Very gravelly
					2. 13-30	Strong brown	Very gravelly sand	Gravel	Granular cinders	70	Very gravelly
					3. 30-57+	Very dark gray	Extremely gravelly sand	Gravel	Granular cinders	65	Extremely gravelly
94	SWk,SWk, Sec. 30, T.13S.,R.8E.	> 50	> 50	1.5	1. 0-15	Dark brown	Loamy sand	N/A	N/A	0	N/A
					2. 15-50+	Black	Sand	N/A	N/A	0	N/A
95	NEk,SWk, Sec. 33, T.13S.,R.8E.	> 50	> 60	1.5	1. 0-18	Dark brown	Loamy sand	N/A	N/A	0	N/A
					2. 18-40	Black	Sand	N/A	N/A	0	N/A
					3. 40-52	Dark brown to brown	Loamy sand	Gravel	Subrounded	5	N/A
					4. 52-60+	Dark brown	Cobbly sandy loam	Gravel, cobbles, and stones	Subrounded	35	Cobbly
96	NEk,NWk, Sec. 9, T.24S.,R.9E.	> 70	> 70	0.3	1. 0-8	Yellowish brown	Loamy coarse sand	Gravel	Granular pumice	20	N/A
					2. 8-30	Brownish yellow	Gravelly coarse sand	Gravel	Granular pumice	35	Gravelly
					3. 30-56	Light yellowish brown	Coarse sand	Gravel	Granular pumice	5	N/A
					4. 56-70+	Strong brown	Gravelly sandy loam	Gravel	Subrounded	35	Gravelly
97	SWk,NEk, Sec. 23, T.22S.,R.6E.	50	50	1.0	1. 0-2	Dark brown	Loamy coarse sand	Gravel	Granular pumice	20	N/A
					2. 2-10	Brown	Gravelly loamy coarse sand	Gravel	Granular pumice	35	Gravelly
					3. 10-21	Brownish yellow	Gravelly loamy coarse sand	Gravel	Granular pumice	35	Gravelly
					4. 21-38	Light yellowish brown	Coarse sand	Gravel	Granular pumice	5	N/A
					5. 38-50	Dark brown	Sandy loam	Cobbles and stones	Subangular	20	N/A
98	NWk,NWk, Sec. 35, T.22S.,R.8E.	46	46	1.5	1. 0-12	Dark brown and brown	Loamy coarse sand	Gravel	Granular pumice	20	N/A
					2. 12-41	Brownish yellow and light yellowish brown	Gravelly loamy coarse sand and coarse sand	Gravel	Granular pumice	35	Gravelly
					3. 41-45	Dark brown	Sandy loam	Gravel, cobbles, and stones	Subangular blocky	30	Stony
2A	SEk,NEk, Sec. 20, T.18S.,R.8E.	> 60	50	0.2	1. 0-15	Pale brown	Very gravelly loamy coarse sand	Gravel	Granular to blocky pumice	78	Very gravelly
					2. 15-30	Strong brown	Loamy sand	Gravel	Subrounded	5	N/A
					3. 30-50	Dark brown	Sandy loam	Cobbles, stones, and gravel	Subrounded	30	N/A
					4. 50-60+	Grayish brown	Very cobbly sandy loam	Cobbles, stones, and gravel	Subrounded	60	Very cobbly

1/ Miscellaneous landtypes are not included.

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART II

Land-type No.	Structure: Grade	Structure: Size	Structure: Type	Cementation or Compaction	Permeability	Consistence: Dry	Consistence: Moist	Consistence: Wet	pH	Estimated Taxonomic Classification
87	Weak	Fine	Granular	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	Entic Cryandepts, ashy over loamy-skeletal, mixed family
	N/A	N/A	Massive	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.3	
90	Weak	Fine	Subangular blocky	None	Rapid	Soft	Very friable	Slightly sticky, slightly plastic	6.4	Typic Cryandepts, ashy over loamy-skeletal, mixed family
	Weak	Fine	Subangular blocky	None	Rapid	Soft	Friable	Slightly sticky, slightly plastic	6.8	
	Moderate	Medium	Subangular blocky	None	Moderate	Slightly hard	Friable to firm	Sticky, slightly plastic	6.6	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.6	
91	Weak	Fine	Granular	None	Rapid	Soft	Very friable	Slightly sticky, slightly plastic	7.0	Typic Haploxerolls, medial, mixed, mesic family
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.4	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.5	
92	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.2	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
93	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.5	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.6	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.6	
94	N/A	N/A	Single grain	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	Typic Cryorthents, ashy, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.9	
95	N/A	N/A	Single grain	None	Very rapid	Loose to soft	Loose to very friable	Nonsticky, nonplastic	6.5	Entic Cryandepts, ashy, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.7	
	N/A	N/A	Massive	None	Very rapid	Slightly hard	Friable	Nonsticky, nonplastic	6.9	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Nonsticky, nonplastic	6.5	
96	N/A	N/A	Single grain	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	7.0	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Nonsticky, nonplastic	6.5	
97	Weak	Medium	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.3	Typic Cryorthents, cindery, mixed family
	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.3	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	7.0	
	N/A	N/A	Massive	None	Rapid	Soft	Friable	Slightly sticky, nonplastic	6.4	
98	Weak	Fine	Crumb	None	Very rapid	Soft to loose	Very friable	Nonsticky, nonplastic	6.2	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Nonsticky, nonplastic	6.5	
2A	N/A	N/A	Single grain	None	Very rapid	Soft	Loose	Nonsticky, nonplastic	5.8	Typic Cryorthents, cindery over coarse-loamy, mixed family
	N/A	N/A	Massive	Weak	Rapid	Slightly hard	Friable	Nonsticky, nonplastic	5.5	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Nonsticky, nonplastic	6.5	
	N/A	N/A	Massive	Moderate	Slow	Hard	Firm	Nonsticky, nonplastic	6.4	

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART I

Land-type No. 1/	Location of Modal Site	Depth to Bedrock (Inches)	Depth to Restrictive Layer (Inches)	Litter (Inches)	Soil Layer and Thickness (Inches)	Color (Moist)	Texture	Rock Fragments: Size	Shape	%	Rock Fragment Class
2B	NE¼, NE¼, Sec. 32 T.24S., R.6E.	> 60	60	0-0.5	1. 0-7	Dark brown	Loamy sand	Gravel	Granular pumice	20	N/A
					2. 7-36	Yellowish red and light gray	Very gravelly coarse sand	Gravel	Granular pumice	70	Very gravelly
					3. 36-48	Brownish yellow	Coarse sand	Gravel	Granular pumice	25	N/A
					4. 48-60	Dark yellowish brown	Sandy loam	Gravel and cobbles	Subrounded	30	N/A
4A	SE¼, SW¼, Sec. 33, T.21S., R.12E.	> 44	> 44	0.3	1. 0-2	Dark grayish brown	Sandy loam	Gravel	Granular pumice	15	N/A
					2. 2-28	Yellowish brown	Loamy sand	Gravel	Granular pumice	25	N/A
					3. 28-34	Grayish brown	Sand	Gravel	Granular pumice	5	N/A
					4. 34-44	Dark brown	Sandy loam	Gravel	Rounded	20	N/A
6A	NW¼, SW¼, Sec. 3, T.21S., R.14E.	35	35	0.5	1. 0-13	Dark brown to brown	Loamy sand	Gravel and cobbles	Blocky to platy	2	N/A
					2. 13-30	Yellowish brown	Loamy sand	Cobbles and gravel	Blocky to platy	2	N/A
					3. 30-35	Dark brown	Cobbly sandy loam	Cobbles	Blocky to platy	40	Cobbly
6B	NE¼, SW¼, Sec. 18, T.20S., R.12E.	40	40	1.0	1. 0-10	Dark brown to brown	Loamy sand	Gravel and cobbles	Blocky	2	N/A
					2. 10-31	Yellowish brown	Loamy coarse sand	Gravel and cobbles	Blocky	2	N/A
					3. 31-40	Brown	Very cobbly sandy loam	Cobbles and stones	Blocky	50	Very cobbly
6C	SW¼, NW¼, Sec. 23, T.20S., R.15E.	33	33	0-0.5	1. 0-10	Very dark grayish brown	Sandy loam	Gravel	Platy	15	N/A
					2. 10-28	Brown	Loam	Gravel and cobbles	Platy	30	N/A
					3. 28-33	Brown	Cobbly loam	Gravel and cobbles	Platy	50	Cobbly
6E	NE¼, SW¼, Sec. 20, T.21S., R.13E.	> 52	> 52	0.5	1. 0-7	Brown	Loamy sand	Gravel	Blocky pumice	25	N/A
					2. 7-30	Pale brown	Very gravelly loamy sand	Gravel	Blocky pumice	70	Very gravelly
					3. 30-52+	Yellowish brown	Loamy sand to sand	Gravel and cobbles	Blocky	2	N/A
6H	NE¼, SW¼, Sec. 36, T.18S., R.9E.	40	40	1.5	1. 0-8	Dark brown	Loamy sand	Gravel	Irregular and granular pumice	5	N/A
					2. 8-28	Strong brown	Loamy sand	Gravel	Granular and blocky	10	N/A
					3. 28-40	Brown	Cobbly sandy loam	Cobbles and stones	Blocky	45	Cobbly
6J	SW¼, SW¼, Sec. 22, T.19S., R.11E.	32	32	1.0	1. 0-10	Dark brown	Loamy sand	Gravel and cobbles	Granular pumice and blocky	3	N/A
					2. 10-28	Yellowish brown	Loamy sand to sand	Gravel and cobbles	Granular pumice and blocky	8	N/A
					3. 28-32	Brown	Cobbly loamy fine sand	Cobbles and stones	Blocky	50	Cobbly
7A	SE¼, SW¼, Sec. 35, T.20S., R.12E.	30	30	0.5	1. 0-3	Very dark grayish brown	Cobbly loamy sand	Cobbles	Blocky	40	Cobbly
					2. 3-30	Yellowish brown	Very cobbly loamy sand to sand	Cobbles and stones	Blocky	65	Very cobbly
7B	NW¼, NE¼, Sec. 9, T.13S., R.8E.	36	36	0.3	1. 0-5	Grayish brown	Gravelly loamy sand	Gravel	Granular pumice to blocky	40	Gravelly
					2. 5-18	Pale brown to gray	Pumice gravel	Gravel	Granular pumice to blocky	85	Gravelly
					3. 18-36	Yellowish brown	Very cobbly loamy sand	Cobbles and stones	Blocky	65	Very cobbly
7E	NW¼, NE¼, Sec. 25, T.22S., R.12E.	38	38	0.4	1. 0-8	Very dark grayish brown to dark yellowish brown	Loamy sand	Gravel	Granular pumice	10	N/A
					2. 8-15	Yellowish brown to brownish yellow	Loamy coarse sand	Gravel	Granular pumice	30	N/A
					3. 15-26	Light yellowish brown	Coarse sand	Gravel and cobbles	Blocky and granular	2	N/A
					4. 26-38	Brown to dark brown	Very cobbly sandy loam	Cobbles	Blocky	60	Very cobbly

1/ Miscellaneous landtypes are not included.

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART II

Land-type No.	Structure: Grade	Size	Type	Cementation or Compaction	Permeability	Consistence: Dry	Moist	Wet	pH	Estimated Taxonomic Classification
2B	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.0	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.5	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.5	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.3	
4A	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	Typic Cryorthents, ashy over coarse-loamy, mixed family
	N/A	N/A	Massive to single grain	None	Very rapid	Soft to loose	Very friable	Nonsticky, nonplastic	6.5	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Rapid	Soft to slightly hard	Friable	Nonsticky, nonplastic	5.4	
6A	Weak	Fine	Granular	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.8	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Massive to single grain	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	7.0	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.6	
6B	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Massive to single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.8	
6C	Weak	Fine	Granular	None	Rapid	Soft	Very friable	Slightly sticky, slightly plastic	7.1	Xerollic Camborthids, medial over loamy, mixed, mesic family
	N/A	N/A	Massive	None	Moderate	Slightly hard	Firm	Slightly sticky, slightly plastic	7.0	
	N/A	N/A	Massive	None	Moderate	Slightly hard	Firm	Slightly sticky, slightly plastic	7.0	
6E	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.0	Typic Cryorthents, cindery over ashy, mixed family
	N/A	N/A	Single grain	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	
	N/A	N/A	Single grain	None	Very rapid	Loose	Very friable	Nonsticky, nonplastic	6.8	
6H	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.0	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Massive to single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.5	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.5	
6J	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Massive to single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Very rapid	Slightly hard	Friable	Nonsticky, nonplastic	6.8	
7A	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.0	Typic Cryorthents, ashy-skeletal, mixed family
	N/A	N/A	Massive to single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.5	
7B	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	5.8	Typic Cryorthents, cindery-skeletal, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.0	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.4	
7E	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.4	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Single grain to massive	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.5	

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART I

Land-type No. 1/	Location of Modal Site	Depth to Bedrock (Inches)	Depth to Restrictive Layer (Inches)	Litter (Inches)	Soil Layer and Thickness (Inches)	Color (Moist)	Texture	Rock Fragments: Size	Rock Fragments: Shape	Rock Fragments: %	Rock Fragment Class
7F	NE¼, NE¼, Sec. 21, T.21S., R.12E.	34	34	1.0	1. 0-8	Brown	Loamy sand	Gravel	Granular pumice	5	N/A
					2. 8-28	Yellowish brown	Loamy coarse sand	Gravel	Granular pumice	10	N/A
					3. 28-34	Brown	Very cobbly loamy fine sand	Cobbles and stones	Blocky	60	Very cobbly
7G	SW¼, SW¼, Sec. 8, T.22S., R.13E.	> 60	> 50	0.2	1. 0-3	Dark grayish brown	Gravelly loamy coarse sand	Gravel	Blocky to granular pumice	40	Gravelly
					2. 3-40	Light gray	Pumice gravel	Gravel	Blocky to granular pumice	85	Gravelly
					3. 40-60	Yellowish brown	Loamy sand	Gravel	Blocky	10	N/A
7H	SE¼, SW¼, Sec. 27, T.20S., R.15E.	38	38	0.5	1. 0-3	Dark grayish brown	Sandy loam	Gravel and cobbles	Platy	20	N/A
					2. 3-21	Dark yellowish brown	Loamy sand	Gravel and cobbles	Platy	30	N/A
					3. 21-38	Dark yellowish brown	Very cobbly loamy sand	Gravel, cobbles, and stones	Platy and blocky	70	Very cobbly
7J	NE¼, SW¼, Sec. 31, T.21S., R.16E.	> 50	> 50	0.5	1. 0-24	Grayish brown	Pumice gravel	Gravel	Blocky to granular pumice	85	Gravelly
					2. 24-40	Yellowish brown	Loamy sand	Gravel	Granular pumice	10	N/A
					3. 40-50	Dark brown	Sandy loam	Gravel	Rounded	25	N/A
7K	NE¼, SW¼, Sec. 20, T.23S., R.16E.	32	32	1.0	1. 0-3	Very dark grayish brown	Sandy loam	Gravel	Blocky and platy	8	N/A
					2. 3-14	Dark brown	Sandy loam	Gravel and cobbles	Blocky and platy	15	N/A
					3. 14-32	Dark brown	Cobbly loam	Cobbles, gravel, and stones	Blocky and platy	35	Cobbly
8A	SW¼, NE¼, Sec. 13, T.23S., R.6E.	48	48	2.0	1. 0-10	Gray to dark grayish brown	Loamy sand	Gravel	Granular pumice	25	N/A
					2. 10-38	Strong brown to yellowish brown	Gravelly coarse sand	Gravel	Granular pumice	35	Gravelly
					3. 38-48	Brown	Cobbly sandy loam	Cobbles and stones	Blocky	35	Cobbly
8B	NE¼, NE¼, Sec. 8, T.23S., R.6E.	42	42	2.0	1. 0-8	Dark brown	Loamy sand	Gravel	Granular pumice	20	N/A
					2. 8-30	Strong brown to yellowish brown	Coarse sand	Gravel	Granular pumice	30	N/A
					3. 30-42	Dark brown	Cobbly sandy loam	Cobbles and stones	Blocky	40	Cobbly
9A	NE¼, NW¼, Sec. 23, T.24S., R.7E.	> 65	> 65	2.0	1. 0-10	Dark brown	Loamy coarse sand	Gravel	Granular pumice	30	N/A
					2. 10-33	Brownish yellow	Gravelly loamy coarse sand	Gravel	Granular pumice	50	Gravelly
					3. 33-58	Light yellowish brown	Coarse sand	Gravel	Granular pumice	20	N/A
					4. 58-65+	Dark brown	Cobbly sandy loam	Cobbles, stones, and gravel	Blocky	35	Cobbly
9B	SW¼, SW¼, Sec. 23, T.24S., R.7E.	> 65	> 55	1.5	1. 0-8	Grayish brown to dark yellowish brown	Loamy coarse sand	Gravel	Granular pumice	30	N/A
					2. 10-35	Strong brown	Very gravelly loamy coarse sand	Gravel	Granular pumice	60	Very gravelly
					3. 35-55	Light yellowish brown	Coarse sand	Gravel	Granular pumice	20	N/A
					4. 55-65+	Reddish brown	Cobbly sandy loam	Cobbles, stones, and gravel	Blocky	40	Cobbly
9C	SW¼, SW¼, Sec. 26, T.24S., R.7E.	> 60	> 60	1.5	1. 0-13	Dark yellowish brown	Loamy coarse sand	Gravel	Granular pumice	25	N/A
					2. 13-33	Brownish yellow	Very gravelly loamy coarse sand	Gravel	Granular pumice	55	Very gravelly
					3. 33-50	Light yellowish brown	Coarse sand	Gravel	Granular pumice	15	N/A
					4. 50-60+	Dark brown	Cobbly sandy loam	Cobbles and stones	Granular pumice	40	Cobbly
9F	SW¼, SW¼, Sec. 35, T.23S., R.9E.	> 62	> 62	1.5	1. 0-12	Dark yellowish brown	Loamy coarse sand	Gravel	Granular pumice	25	N/A
					2. 12-36	Brownish yellow	Gravelly loamy coarse sand	Gravel	Granular pumice	40	Gravelly
					3. 36-50	Light yellowish brown	Coarse sand	Gravel	Granular pumice	10	N/A
					4. 50-62+	Brown	Gravelly sandy loam	Gravel and cobbles	Subrounded	40	Gravelly

1/ Miscellaneous landtypes are not included.

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART II

Land-type No.	Structure: Grade	Structure: Size	Structure: Type	Cementation or Compaction	Permeability	Consistence: Dry	Consistence: Moist	Consistence: Wet	pH	Estimated Taxonomic Classification
7F	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.0	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Massive to single grain	None	Very rapid	Soft	Very friable to loose	Nonsticky, nonplastic	6.4	
	N/A	N/A	Massive	None	Very rapid	Slightly hard	Friable	Nonsticky, nonplastic	6.5	
7G	N/A	N/A	Massive	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	5.8	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.0	
	N/A	N/A	Massive to single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.5	
7H	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	7.0	Typic Cryorthents, ashy over loamy-skeletal, mixed family
	N/A	N/A	Single grain to massive	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.5	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.5	
7J	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.5	Typic Cryorthents, cindery over medial, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	7.0	
	N/A	N/A	Massive	None	Very rapid	Soft	Friable	Nonsticky, nonplastic	7.0	
7K	Weak	Medium	Granular	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.8	Typic Cryorthents, medial over loamy-skeletal, mixed family
	N/A	N/A	Massive	None	Rapid	Soft	Very friable	Nonsticky, nonplastic	6.7	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	7.0	
8A	N/A	N/A	Massive to single grain	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.0	Entic Cryorthods, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.5	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, nonplastic	6.5	
8B	N/A	N/A	Massive to single grain	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.3	Typic Cryorthents, cindery over loamy-skeletal, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.5	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, nonplastic	6.5	
9A	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.2	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.6	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.5	
9E	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.0	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.3	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.4	
9C	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.7	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.9	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.5	
9F	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.9	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.5	

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART I

Land-type No. 1/	Location of Modal Site	Depth to Bedrock (Inches)	Depth to Restrictive Layer (Inches)	Litter (Inches)	Soil Layer and Thickness (Inches)	Color (Moist)	Texture	Rock Fragments: Size	Rock Fragments: Shape	Rock Fragments: %	Rock Fragment Class
9G	NE¼, NW¼, Sec. 25, T.23S., R.6E.	> 68	> 64	1.5	1. 0-12	Dark yellowish brown	Loamy coarse sand	Gravel	Granular pumice	20	N/A
					2. 12-32	Strong brown to pale brown	Gravelly loamy coarse sand to sand	Gravel	Granular pumice	50	Gravelly
					3. 32-42	Light yellowish brown	Coarse sand	Gravel	Granular pumice	10	N/A
					4. 42-64	Brown	Cobbly sandy loam	Gravel, cobbles, and stones	Subrounded	35	Cobbly
					5. 64-68+	Dark grayish brown	Very cobbly loamy sand	Gravel, cobbles, and stones	Subrounded	60	Very cobbly
9J	SW¼, NW¼, Sec. 19, T.23S., R.7E.	> 60	> 60	1.5	1. 0-16	Dark yellowish brown	Loamy coarse sand	Gravel	Granular pumice	20	N/A
					2. 16-28	Strong brown	Gravelly loamy coarse sand to sand	Gravel	Granular pumice	45	Gravelly
					3. 28-40	Light yellowish brown	Coarse sand	Gravel	Granular pumice	15	N/A
					4. 40-52	Brown	Cobbly sandy loam	Gravel, cobbles, and stones	Subrounded	35	Cobbly
					5. 52-60	Dark grayish brown	Very cobbly loamy sand	Gravel, cobbles, and stones	Subrounded	60	Very cobbly
9K	SE¼, NW¼, Sec. 36, T.26S., R.6½E.	> 60	> 50	0.5	1. 0-8	Brown	Gravelly loamy coarse sand	Gravel	Granular pumice	35	Gravelly
					2. 8-40	Yellowish red to light gray	Extremely gravelly sand	Gravel	Granular pumice	85	Extremely gravelly
					3. 40-60+	Pale yellow	Gravelly coarse sand	Gravel	Granular pumice	40	Gravelly
9L	SW¼, SW¼, Sec. 34, T.24S., R.7E.	> 65	> 65	0.75	1. 0-3	Very dark grayish brown	Loamy sand	Gravel	Granular pumice	25	N/A
					2. 3-8	Brown	Gravelly loamy coarse sand	Gravel	Granular pumice	40	Gravelly
					3. 8-25	Brownish yellow	Very gravelly coarse sand	Gravel	Granular pumice	55	Very gravelly
					4. 25-65	Pale brown	Gravelly coarse sand	Gravel	Granular pumice	35	Gravelly
9M	NE¼, NW¼, Sec. 23, T.25S., R.7E.	> 100	> 100	2.0	1. 0-15	Dark yellowish brown and yellowish brown	Gravelly loamy coarse sand	Gravel	Granular pumice	35	Gravelly
					2. 15-55	Pale brown	Very gravelly coarse sand	Gravel	Granular pumice	70	Very gravelly
					3. 55-80	Pale brown	Gravelly coarse sand	Gravel	Granular pumice	35	Gravelly
					4. 80-100+	Dark yellowish brown	Cobbly loam	Cobbles and gravel	Subrounded	50	Cobbly
9N	NE¼, NW¼, Sec. 3C, T.25S., R.7E.	> 76	> 76	2.0	1. 0-3	Very dark grayish brown	Loamy sand	Gravel	Granular pumice	20	N/A
					2. 3-15	Dark yellowish brown	Gravelly loamy coarse sand	Gravel	Granular pumice	30	Gravelly
					3. 15-38	Yellowish red to pale brown	Very gravelly coarse sand	Gravel	Granular pumice	75	Very gravelly
					4. 38-70	Pale brown to light grey	Coarse sand	Gravel	Granular pumice	25	N/A
					5. 70-76+	Dark brown	Sandy loam	Cobbles	Blocky	30	N/A
9P	SW¼, SW¼, Sec. 11, T.26S., R.6½E.	> 80	> 50	2.0	1. 0-13	Brown	Loamy sand	Gravel	Granular pumice	20	N/A
					2. 13-33	Yellowish red to pale brown mottled particles	Very gravelly coarse sand	Gravel	Granular pumice	75	Very gravelly
					3. 33-70	Pale brown	Gravelly coarse sand	Fine gravel	Granular pumice	35	Gravelly
					4. 70-80+	Dark brown	Cobbly sandy loam	Cobbles and gravel	Platy and sub-angular	35	Cobbly
9R	NW¼, SW¼, Sec. 22, T.26S., R.7E.	> 60	> 60	1.5	1. 0-14	Yellowish brown	Loamy sand	Gravel	Granular pumice	25	N/A
					2. 14-40	Brownish yellow	Very gravelly coarse sand	Gravel	Granular pumice	80	Very gravelly
					3. 40-60+	Pale brown	Gravelly coarse sand	Fine gravel	Granular pumice	40	Gravelly
9S	SW¼, NW¼, Sec. 1, T.26S., R.8E.	> 76	> 76	2.0	1. 0-13	Dark yellowish brown	Loamy sand	Gravel	Granular pumice	20	N/A
					2. 13-40	Yellowish brown	Very gravelly coarse sand	Gravel	Granular pumice	80	Very gravelly
					3. 40-70	Pale brown	Gravelly coarse sand	Fine gravel	Granular pumice	45	Gravelly
					4. 70-76	Dark yellowish brown	Sandy loam	Gravel	Subrounded	20	N/A

1/ Miscellaneous Landtypes are not included.

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART II

Land-type No.	Structure: Grade	Structure: Size	Structure: Type	Cementation or Compaction	Permeability	Consistence: Dry	Consistence: Moist	Consistence: Wet	pH	Estimated Taxonomic Classification
9G	Weak	Fine	Crumb to single grain	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.0	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	5.5	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, nonplastic	6.5	
	N/A	N/A	Massive	Moderate	Slow to moderate	Hard	Firm	Slightly sticky, nonplastic	6.5	
9J	Weak	Fine	Crumb to single grain	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.0	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.5	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.5	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, nonplastic	6.4	
	N/A	N/A	Massive	None	Moderate	Hard	Firm	Slightly sticky, nonplastic	6.5	
9K	N/A	N/A	Single grain	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	5.8	Typic Cryorthods, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.0	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.2	
9L	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.7	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	7.0	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	7.0	
9M	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	5.0	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	5.7	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.9	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, slightly plastic	6.5	
9N	Weak	Fine	Crumb	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.0	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.5	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.6	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Nonsticky, nonplastic	6.5	
9P	N/A	N/A	Single grain	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.0	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.3	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Rapid	Slightly hard to soft	Friable	Nonsticky, nonplastic	6.5	
9R	N/A	N/A	Single grain	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.2	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.6	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
9S	N/A	N/A	Single grain	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.4	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.7	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Rapid	Soft	Friable	Nonsticky, nonplastic	6.4	

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART I

Land-type No. 1/	Location of Modal Site	Depth to Bedrock (Inches)	Depth to Restrictive Layer (Inches)	Litter (Inches)	Soil Layer and Thickness (Inches)	Color (Moist)	Texture	Rock Fragments: Size	Rock Fragments: Shape	Rock Fragments: %	Rock Fragment Class
9T	NW¼,SE¼, Sec. 35, T.25S.,R.7E.	>124	>124	2.5	1. 0-12	Brown	Gravelly loamy sand	Gravel	Granular pumice	35	Gravelly
					2. 12-42	Brownish yellow	Extremely gravelly sand	Gravel	Granular pumice	85	Extremely gravelly
					3. 42-100	Pale brown	Gravelly coarse sand	Gravel	Granular pumice	45	Gravelly
					4. 100-124	Brown	Loamy sand	Gravel	Irregular cinders	30	N/A
					5. 124+	Dark gray	Cinder gravel	Gravel	Cinders	85	Gravel
9U	NW¼,NW¼, Sec. 31, T.21S.,R.14E.	>70	>70	0.5	1. 0-9	Brown and grayish brown	Gravelly loamy sand	Gravel	Granular pumice	40	Gravelly
					2. 9-40	Light brownish gray	Extremely gravelly sand	Gravel	Granular pumice	90	Extremely gravelly
					3. 40-60	Yellowish brown	Loamy sand and sand	Gravel	Granular pumice	5	N/A
					4. 60-70	Strong brown	Cobbly loamy sand	Cobbles and stones	Blocky	40	Cobbly
9V	SW¼,SW¼, Sec. 8, T.22S.,R.14E.	>55	>55	0.2	1. 0-6	Grayish brown	Gravelly loamy sand	Gravel	Granular pumice	40	Gravelly
					2. 6-30	Light brownish gray	Extremely gravelly sand	Gravel	Granular pumice	90	Extremely gravelly
					3. 30-55	Yellowish brown	Very stony loamy sand and sand	Cobbles and stones	Blocky	60	Very stony
9W	SW¼,SW¼, Sec. 33, T.26S.,R.7E.	>60	>60	1.0	1. 0-9	Brown	Gravelly loamy coarse sand	Gravel	Granular pumice	35	Gravelly
					2. 9-40	Reddish yellow and light gray mottled particles	Extremely gravelly sand	Gravel	Granular pumice	90	Extremely gravelly
					3. 40-60+	Pale brown	Gravelly coarse sand	Gravel	Granular pumice	40	Gravelly
9X	NE¼,SW¼, Sec. 31, T.21S.,R.14E.	>65	>65	1.0	1. 0-8	Grayish brown	Gravelly loamy coarse sand	Gravel	Granular pumice	40	Gravelly
					2. 8-45	Light brownish gray	Extremely gravelly loamy sand	Gravel	Granular pumice	90	Extremely gravelly
					3. 45-65	Yellowish brown	Loamy coarse sand	Gravel	Granular pumice	10	N/A
9Y	NE¼,SE¼, Sec. 22, T.26S.,R.6½E.	>65	>65	2.0	1. 0-10	Brown	Gravelly loamy coarse sand	Gravel	Granular pumice	35	Gravelly
					2. 10-38	Reddish yellow and light gray mottled particles	Very gravelly coarse sand	Gravel	Granular pumice	80	Very gravelly
					3. 38-65+	Pale brown	Gravelly coarse sand	Gravel	Granular pumice	40	Gravelly
9Z	SW¼,SW¼, Sec. 20, T.23S.,R.8E.	>55	>55	1.5	1. 0-10	Dark brown	Gravelly loamy coarse sand	Gravel	Granular pumice	30	Gravelly
					2. 10-33	Brownish yellow	Very gravelly loamy coarse sand	Gravel	Granular pumice	55	Very gravelly
					3. 33-48	Light yellowish brown	Coarse sand	Gravel	Granular pumice	5	N/A
					4. 48-55	Reddish brown	Sandy loam	Cobbles and stones	Subangular and angular	20	N/A

1/ Miscellaneous landtypes are not included.

TABLE OF SOIL CHARACTERISTICS OF MODAL SITES - PART II

Land-type No.	Structure: Grade	Structure: Size	Structure: Type	Cementation or Compaction	Permeability	Consistence: Dry	Consistence: Moist	Consistence: Wet	pH	Estimated Taxonomic Classification
9T	N/A	N/A	Single grain to massive	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.2	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.6	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Very rapid	Soft	Friable	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.9	
9U	N/A	N/A	Single grain	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.0	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.4	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Massive	None	Very rapid	Soft	Friable	Nonsticky, nonplastic	6.5	
9V	N/A	N/A	Single grain	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.0	Typic Cryorthents, cindery over cindery-skeletal, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.5	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	7.0	
9W	N/A	N/A	Single grain	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	5.8	Entic Cryorthods, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.2	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.5	
9X	N/A	N/A	Single grain	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.0	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.5	
	N/A	N/A	Single grain to massive	None	Very rapid	Loose	Friable to loose	Nonsticky, nonplastic	6.8	
9Y	N/A	N/A	Single grain	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.0	Entic Cryorthods, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.2	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.5	
9Z	N/A	N/A	Single grain	None	Very rapid	Soft	Very friable	Nonsticky, nonplastic	6.4	Typic Cryorthents, cindery, mixed family
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.8	
	N/A	N/A	Single grain	None	Very rapid	Loose	Loose	Nonsticky, nonplastic	6.9	
	N/A	N/A	Massive	None	Rapid	Slightly hard	Friable	Slightly sticky, nonplastic	6.5	

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

TABLE OF BEDROCK CHARACTERISTICS

Land-type No.	Type	Color (fresh surface)	Hardness	Degree of Fracturing	Fracture System	Fracture Surface	Competency	Remarks
1	Basalts, andesites, dacites, and rhyolites	Black to gray	Hard	High to moderate	Blocky	Irregular to regular	Competent	Lava flows
3	Undifferenciated, complex volcanics	N/A	N/A	N/A	N/A	N/A	N/A	Complex rock outcrops, talus, and glaciers
6	Basalts, andesites, dacites, and rhyolites	Black to light red	Hard	High to moderate	Platy and blocky	Regular	Competent	
11	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Irregular to regular	Competent	
12	Basalts, andesites, dacites, and rhyolites	Black to gray	Hard	Moderate	Platy and blocky	Regular	Competent	Volcanic tuffs and breccias may be included
13	Undifferenciated, complex volcanics	N/A	N/A	N/A	N/A	N/A	N/A	High elevation rocky slopes on shield and composite volcanos
14	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Irregular to regular	Competent	Steep edges of lava flows
15 - 49	N/A Not Bedrock Units							
50	Tuffs, breccias, and volcanics sediments	Brown, light gray, and red	Moderately hard to soft	Slight	Random	Irregular	Moderately competent	Some layers of basalts and andesites are included
51	Tuffs and breccias	Brown, light gray, and red	Moderately hard to soft	Slight to moderate	Random	Irregular	Moderately competent	Some layers of basalts and andesites are included
52	Tuffs and breccias	Brown, light gray, and red	Moderately hard to soft	Slight to moderate	Random	Irregular	Moderately competent	Some layers of basalts and audesites are included
53	Tuffs, breccias, basalts, and andesites	Yellowish brown to black	Hard to moderately hard	Moderate to slight	Random to platy	Irregular to regular	Moderately competent to competent	
54	Tuffs and breccias	Brown to very pale brown	Moderately hard to soft	Slight	Random	Irregular	Moderately competent	
55	Tuffs and breccias	Brown to very pale brown	Moderately hard to soft	Slight	Random	Irregular	Moderately competent	
56	Tuffs, breccias, and compact pumice	Dark gray to very pale brown	Moderately hard to soft	Slight to massive	Random	Irregular	Moderately competent	
57	Tuffs and breccias	Very pale brown to yellowish brown	Moderately hard to hard	Slight to massive	Random	Irregular	Moderately competent	
58	Tuffs and breccias	Very pale brown to yellowish brown	Moderately hard to hard	Slight to massive	Random	Irregular	Moderately competent	
59	Tuffs, breccias, compact pumice and basalts	Black, gray, light brown, and pink	Soft to hard	Moderate to slight	Random and blocky	Regular to irregular	Incompetent to competent	Stratified volcanic materials
60	Basalts and andesites	Black to gray	Hard	Moderate to high	Blocky	Regular	Competent	

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

TABLE OF BEDROCK CHARACTERISTICS

Land-type No.	Type	Color (fresh surface)	Hardness	Degree of Fracturing	Fracture System	Fracture Surface	Competency	Remarks
61	Basalts and andesites	Black to gray	Hard	Moderate to high	Blocky to platy	Regular	Competent	
62	Basalts and andesites	Black to gray	Hard	Moderate to high	Blocky to platy	Regular	Competent	
63	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular	Competent	
64	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular to irregular	Competent	
65	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular to irregular	Competent	
66	Basalts, andesites, and rhyolites	Black, gray, and pink	Hard	High to moderate	Blocky to platy	Regular	Competent	
67	Basalts, andesites, and rhyolites	Black, gray, and pink	Hard	High to moderate	Blocky to platy	Regular	Competent	
68	Basalts, andesites, and rhyolites	Black, gray, and pink	Hard	High to moderate	Blocky to platy	Regular	Competent	
69	Basalts, andesites, and rhyolites	Black, gray, and pink	Hard	Moderate to high	Blocky to platy	Regular	Competent	
70	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular to irregular	Competent	
71	Basalts and andesites	Black, gray, and reddish brown	Hard	Moderate to high	Blocky to platy	Regular	Competent	
72	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular to irregular	Competent	
73	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular	Competent	
74	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular and irregular	Competent	
75	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular and irregular	Competent	
76	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular and irregular	Competent	
77	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular and irregular	Competent	
78	Andesites, basalts, and rhyolites	Black, gray, and reddish brown	Hard	Moderate to high	Blocky to platy	Regular	Competent	Some tuffs and breccias may be included.
79	Basalts, andesites, and rhyolites	Black, gray, and reddish brown	Hard	Moderate to high	Blocky to platy	Regular	Competent	
84	Basalts, andesites, tuffs, and breccias	Black, gray, and light brown	Hard to soft	High to slight	Blocky to random	Regular and irregular	Competent to incompetent	Stratified volcanic materials on shield and composite volcanos
85	Basalts, andesites, tuffs, and breccias	Black, gray, and light brown	Hard to soft	High to slight	Blocky to random	Regular and irregular	Competent to incompetent	Stratified volcanic materials on shield and composite volcanos
86	Basalts, andesites, tuffs, and breccias	Black, gray, dark reddish brown, and brown	Hard to soft	High to moderate	Blocky to random	Regular and irregular	Competent to incompetent	Stratified volcanic materials on composite volcanos

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

TABLE OF BEDROCK CHARACTERISTICS

Land-type No.	Type	Color (fresh surface)	Hardness	Degree of Fracturing	Fracture System	Fracture Surface	Competency	Remarks
87	Basalts, andesites, tuffs, and breccias	Black, gray, dark reddish brown, and brown	Hard to soft	High to moderate	Blocky to random	Regular and irregular	Competent to incompetent	Stratified volcanic materials on composite volcanos
88	Basalts, andesites, tuffs, breccias, and waterlain sediments	Variable, black to white	Hard to soft	High to massive	Blocky to random	Regular and irregular	Competent to incompetent	Stratified volcanics und waterlain deposits, including some diatemaceous earth
89	Basalts, andesites, tuffs, breccias, and waterlain sediments	Variable, black to white	Hard to soft	High to massive	Blocky to random	Regular and irregular	Competent to incompetent	Stratified volcanics and deposits, including some diatemaceous earth
90	Basalts, andesites, tuffs, breccias, and waterlain sediments	Variable, black to white	Hard to soft	High to massive	Blocky to random	Regular and irregular	Competent to incompetent	Stratified volcanics and waterlain deposits, including some diatemaceous earth
91	Dacites, andesites, tuffs, and breccias	Black to pale brown	Hard and moderately hard	High to slight	Blocky, platy, and random	Regular and irregular	Competent to moderately competent	Stratified volcanics on composite or shield volcanos
92	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular	Competent	
93	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular	Competent	
97	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular	Competent	
98	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular	Competent	
1A	Andesites, dacites, and basalts	Gray to black	Hard	Moderate	Blocky to platy	Regular	Competent	May have inclusions of tuffs and breccias
5A	Tuffs and breccias	Yellowish brown to very pale brown	Moderately hard	Slight to massive	Random	Irregular	Moderately competent	May have inclusions of basalts and andesites
6A	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular	Competent	
6B	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular	Competent	
6C	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky to platy	Regular	Competent	
6E	Basalts, andesites, tuffs, breccias, and compact pumice	Black to very pale brown	Hard to soft	High to massive	Blocky to random	Regular and irregular	Competent to incompetent	Complex volcanics on a composite volcano
6G	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular	Competent	
6H	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular	Competent	
6J	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular	Competent	

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

TABLE OF BEDROCK CHARACTERISTICS

Land-type No.	Type	Color (fresh surface)	Hardness	Degree of Fracturing	Fracture System	Fracture Surface	Competency	Remarks
7A	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular and irregular	Competent	
7B	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular and irregular	Competent	
7C	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular and irregular	Competent	
7E	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular	Competent	
7F	Basalts and andesites	Black to gray	Hard	High to moderate	Blocky	Regular and irregular	Competent	
7G	Basalts, andesites, tuffs, and breccias	Black, gray, and pale brown	Hard to soft	High to slight	Blocky to random	Regular and irregular	Competent	
7H	Basalts, dacites andesites, and rhyolites	Black, gray, and reddish brown	Hard	High to moderate	Blocky and platy	Regular	Competent	
8A	Basalts, andesites, tuffs, and breccias	Black, gray, and light brown	Hard to soft	High to slight	Blocky to random	Regular and irregular	Competent to incompetent	Stratified volcanic materials on shield and composite volcanos
8B	Basalts, andesites, tuffs, and breccias	Black, gray, and light brown	Hard to soft	High to slight	Blocky to random	Regular and irregular	Competent to incompetent	Stratified volcanic materials on shield and composite volcanos
8C	Basalts, andesites, tuffs, breccias, pumice, and cinders	Black, reddish brown, very pale brown	Hard to soft	High to slight	Blocky to random	Regular and irregular	Competent to incompetent	Complex volcanics on a composite volcano
8T	Tuffs and breccias	Yellowish brown to very pale brown	Moderately hard	Slight to massive	Random	Irregular	Moderately competent	
9A	Basalts, andesites, and rhyolites	Black, gray, and reddish brown	Hard	High to moderate	Blocky	Regular	Competent	May have inclusions of tuffs and breccias
9B	Basalts, andesites, and rhyolites	Black, gray, and reddish brown	Hard	High to moderate	Blocky	Regular	Competent	May have inclusions of tuffs and breccias
9C	Basalts, andesites, and rhyolites	Black, gray, and reddish brown	Hard	High to moderate	Blocky to platy	Regular	Competent	May have inclusions of tuffs and breccias
9E	Basalts, andesites, and rhyolites	Black, gray, and reddish brown	Hard	High to moderate	Blocky to platy	Regular	Competent	May have inclusions of tuffs and breccias
9V	Basalts	Black to gray	Hard	High to moderate	Blocky	Regular and irregular	Competent	
9Z	Basalts, andesites, and rhyolites	Black, gray, and reddish brown	Hard	High to moderate	Blocky to platy	Regular	Competent	May have inclusions of tuffs and breccias

Landtypes not listed above are greater than 10 feet to bedrock.

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

EROSION AND HYDROLOGIC INTERPRETATIONS

Land-type no.	Natural Stability	Nature of Mass Movement	Expected Mass Movement as a Result of Man's Activities	Surface Soil Erosion Potential 1	Water Yield Class	Bedrock Hydrologic Characteristics	Hydrologic Group	Sedimentation Yield Potential	Expected Sediment Size
1	Very stable	N/A	Unchanged	N/A	N/A	I	N/A	N/A	N/A
2	Stable	Occasional small slumps	Increased	Moderate	II	I-III	B-D	Moderate to low	Sand and silt
3	Stable	Rock falls and debris slides	Increased	N/A	I	I	N/A	Low	Sand
4	Stable	N/A	Unchanged	Low to Moderate	I	I	A-B	Low to Moderate	Sand
5	Very stable	N/A	Unchanged	Low	II-III	IV	B	Low to moderate	Sand and silt
6	Moderately stable	Debris slides	Increased	Moderate to high	II	I-II	B	Moderate	Sand and silt; some pumice gravel
7	Very stable	N/A	Unchanged	Low	I	I	A	Low	Sand and pumice gravel
8	Stable	N/A	Increased	Low to high (periodic flooding)	II-III	IV	B-C	Variable	Sand and silt
9	Stable	Ravel and small slides	Increased	Low	I-II	I	A	Low	Sand and gravel
10	Stable to moderately stable	Small slumps and slides	Increased	Moderate	II	I-II	B	Moderate	Sand and silt
11	Very stable	N/A	Unchanged	Low	N/A	I	N/A	N/A	N/A
12	Stable	Small slides	Increased	Moderate	II	I-III	B	Moderate	Sand and silt
13	Stable	Debris slides	Increased	Low to moderate	II	I	B	Low	Sand and silt
14	Stable	Rockfall	Increased	Moderate	II	I	B	Low to Moderate	Sand and silt
15	Very stable	N/A	Unchanged	Low	I	I	A	Low	Sand and pumice gravel
16	Stable	N/A	Increased	Low	II	N/A	B	Low	Sand, pumice, gravel and silt
17	Stable	N/A	Unchanged	Low to moderate	I	N/A	B	Low	Sand and silt
18	Moderately stable to stable	Debris slides, slumps	Increased	High to moderate	II	N/A	B	Moderate	Sand and silt
19	Stable	N/A	Unchanged	Low	I	N/A	B	N/A	Sand and silt
20	Stable	N/A	Increased	Low to moderate	II	I	B	Low to moderate	Sand and silt
21	Stable	Small slumps or slides	Increased	Moderate	II	N/A	B	Low to moderate	Sand and silt
22	Stable to moderately stable	Slumps	Increased	Moderate	II	N/A	B	Low to moderate	Sand and silt
23	Stable to moderately stable	Slumps	Increased	Moderate	II	N/A	B	Moderate to low	Sand
24	Unstable to moderately stable	Slumps	Increased	Moderate	II	N/A	B	Moderate to low	Sand and silt
25	Stable	N/A	Increased	Low	I-II	N/A	B	Low	Sand, silt and pumice gravel
26	Stable to moderately stable	N/A	Increased	Low to high	II	N/A	B	Moderate to low	Sand and silt
27	Stable to moderately stable	Small slumps	Increased	Moderate	II	N/A	B	Moderate to low	Sand and silt
28	Stable	N/A	Increased	Low to moderate	II	N/A	B	Low	Sand and silt

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

EROSION AND HYDROLOGIC INTERPRETATIONS

Land-type No.	Natural Stability	Nature of Mass Movement	Expected Mass Movement as a Result of Man's Activities	Surface Soil Erosion Potential 1/	Water Yield Class	Bedrock Hydrologic Characteristics	Hydrologic Group	Sedimentation Yield Potential	Expected Sediment Size
29	Very stable	N/A	Unchanged	Low	I-II	N/A	A-B		Sand and silt
30	Stable	N/A	Unchanged	Low to	II	N/A	B-C	Low to moderate	Sand and silt
31	Stable to moderately stable	Slumps, debris slides	Greatly increased	Moderate	II	N/A	B	Low to moderate	Sand and pumice gravel
32	Very stable	N/A	Unchanged	Low	I-II	N/A	B	Low to moderate	Sand and silt
33	Very stable	N/A	Unchanged	Low	I	N/A	A	Low	Sand
34	Stable	Small slumps	Increased	Low to moderate	I	N/A	A	Low	Sand
35	Very stable	N/A	Unchanged	Moderate	I	N/A	A	Low to moderate	Sand and silt
36	Very stable	N/A	Unchanged	Low	I	N/A	A	Low	Sand and silt
37	Very stable	N/A	Unchanged	Low	I	N/A	A	Low	Sand and silt
38	Stable	N/A	Increased	Moderate	I	N/A	A	Low to moderate	Sand and silt
39	Very stable	N/A	Unchanged		I	N/A	B	Low to moderate	Sand, silt, and clay
40	Very stable	N/A	Unchanged	Low to moderate	II-III	N/A	C	Moderate	Silt, sand, and clay
41	Very stable	N/A	Unchanged	Low	I	N/A	A	Low	Sand and silt
42	Very stable	N/A	Unchanged	Low	I	N/A	A	Low	Sand and silt
43	Very stable	N/A	Unchanged	Low to moderate	III	N/A	D	Low	Sand, silt, and pumice gravel
44	Very stable	N/A	Unchanged	Low	II	N/A	B-C	Low	Sand and pumice gravel
45	Very stable	N/A	Unchanged	Low	I	N/A	A	Low	Sand, silt, and pumice gravel
46	Very stable	N/A	Unchanged	Low	I	N/A	A	Low	Sand, silt, and pumice gravel
47	Very stable	N/A	Unchanged	Low	I	N/A	A	Low	Sand and silt
48	Very stable	N/A	Unchanged	Low	I	N/A	A	Low to moderate	Sand and silt
49	Very stable	N/A	Unchanged	Moderate to high	I	N/A	A	Low to moderate	Sand and silt
50	Stable	Small slides and slumps	Increased	High	III-II	II	C	Moderate	Sand, silt, and clay
51	Stable	Small slides and slumps	Increased	Moderate	II	II	B	Moderate	Sand, silt, and clay
52	Stable	Small slides and slumps	Increased	Moderate	II	II	B	Moderate	Sand, silt, and clay
53	Very stable	N/A	Unchanged	Low	II III	I-III	B-D	Moderate	Silt, clay, and sand
54	Stable	Small slumps	Increased	Low to moderate	II	II	B	Low to moderate	Silt, sand, and clay
55	Stable	Small slumps	Increased	Low to moderate	II	II	B	Low to moderate	Silt, sand, and clay
56	Very stable	N/A	Unchanged	Low	II	I-II	B	Low	Silt and sand
57	Stable	Small slides and ravel	Increased	Moderate	II	II	B	Low to moderate	Sand and pumice gravel; silt and clay from subsoil
58	Stable	Small slides and ravel	Increased	Moderate	II	II	B	Low to moderate	Sand and pumice gravel; silt and clay from subsoil

1/ Wind erosion has not been rated in this section although it could be a problem Forest-wide. There is also movement of surface soil by dry ravel (or surface creep), frost action, and saturated flow above a frozen layer.

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

EROSION AND HYDROLOGIC INTERPRETATIONS

Land-type No.	Natural Stability	Nature of Mass Movement	Expected Mass Movement as a Result of Man's Activities	Surface Soil Erosion Potential 1/	Water Yield Class	Bedrock Hydrologic Characteristics	Hydrologic Group	Sedimentation Yield Potential	Expected Sediment Size
59	Stable	Small slides and ravel	Increased	Moderate	II	I-II	B	Moderate	Sand, silt and pumice gravel
60	Very stable	N/A	Unchanged	Low to moderate	II	I	B	Low to moderate	Silt, sand, and clay
61	Very stable	N/A	Unchanged	Low to moderate	II	I	B	Low to moderate	Sand, silt, and clay
62	Very stable	N/A	Unchanged	Low to moderate	II	I	B	Low to moderate	Sand, silt, and clay
63	Very stable	N/A	Unchanged	Low	I	I	A-B	Low	Sand and silt
64	Very stable	N/A	Unchanged	Low to moderate	I	I	A-B	Low	Sand and silt
65	Very stable	N/A	Unchanged	Low to moderate	I	I	A-B		Sand, silt and pumice gravel
66	Very stable	N/A	Unchanged	Low to moderate	I	I	A-B	Low to moderate	Sand, silt and pumice gravel
67	Very stable	N/A	Unchanged	Low to moderate	I	I	A-B	Low to moderate	Sand, silt and pumice gravel
68	Very stable to stable	Small slides and ravel	Increased	Moderate	I-II	I	A-B	Low to moderate	Sand, silt and pumice gravel
69	Very stable to stable	Small slides and ravel	Increased	Moderate	I-II	I	A-B	Low to moderate	Sand, silt, and pumice gravel
70	Very stable	N/A	Unchanged	Low	I	I	A-B	Low	Sand, silt, and pumice gravel
71	Very stable	N/A	Increased	Moderate	I-II	I	B	Moderate	Sand, silt, and clay
72	Very stable	N/A	Unchanged	Low	I	I	A-B	Low	Sand, silt, and pumice gravel
73	Very stable	N/A	Unchanged	Low to moderate	I-II	I	B	Low to moderate	Sand, silt, and pumice gravel
74	Very stable	N/A	Unchanged	Low	I	I	A-B	Low	Sand, silt, and pumice gravel
75	Very stable	N/A	Unchanged	Low	I	I	A-B	Low	Sand, silt, and pumice gravel
76	Very stable	N/A	Unchanged	Low	I	I	A-B	Low	Sand, silt, and pumice gravel
77	Very stable	N/A	Unchanged	Low	I	I	A-B	Low	Sand, silt, and pumice gravel
78	Stable	Small debris slides	Increased	Moderate	II	I-II	B	Moderate	Sand, silt, and clay
79	Stable	Small debris slides	Increased	Moderate	II	I-II	B	Moderate	Sand, silt, and clay
80	Stable	Small slides and ravel	Increased	Moderate	I	I	A	Low to moderate	Sand, silt, and gravel
81	Stable	Small slides and ravel	Increased	Moderate	I	I	A	Low to moderate	Sand, silt, and gravel
82	Stable	Small slides and ravel	Increased	Moderate	I	I	A	Low to moderate	Sand, silt, and gravel
83	Stable	Small slides and ravel	Increased	Moderate	I	I	A	Low to moderate	Sand, silt, and gravel
84	Stable	Debris slides	Increased	High to Moderate	I-II	I	A-B	Low to moderate	Sand, silt, and pumice gravel
85	Very stable	N/A	Unchanged	Low	I	I II	A-B	Low	Sand, silt, and pumice gravel
86	Stable	Small slides and slumps	Increased	High to moderate	II	I	B	Moderate	Sand and silt
87	Stable	Small slumps and slides	Increased	High to moderate	II	I	B	Moderate	Sand and silt
88	Moderately stable	Small slumps and slides	Increased	High	II	I	B	Moderate	Sand, silt, and clay

1/ Wind erosion has not been rated in this section although it could be a problem Forest-wide. There is also movement of surface soil by dry ravel (or surface creep), frost action, and saturated flow above a frozen layer.

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

EROSION AND HYDROLOGIC INTERPRETATIONS

Land type No.	Natural Stability	Nature of Mass Movement	Expected Mass Movement as a Result of Man's Activities	Surface Soil Erosion Potential 1/	Water Yield Class	Bedrock Hydrologic Characteristics	Hydrologic Group	Sedimentation Yield Potential	Expected Sediment Size
89	Moderately stable to unstable	Slumps, debris slides, rockfall	Greatly increased	Moderate to severe	II	I II	B-C	Moderate	Sand, silt, and clay
90	Moderately stable to stable	Small slumps	Increased	Low to moderate	II	I-II	B	Moderate	Sand, silt, and clay
91	Stable	Small slides	Increased	High to moderate	II	I-II	B	Moderate	Sand, silt, and clay
92	Very stable	N/A	Unchanged	Low	I	I	A	Low	Sand and silt
93	Very stable	N/A	Unchanged	Low	I	I	A	Low	Sand
94	Very stable	N/A	Unchanged	Moderate	I	N/A	A-B	Moderate	Sand
95	Very stable	N/A	Unchanged	Moderate to high	I	N/A	A-B	Moderate	Sand
96	Very stable	N/A	Unchanged	Low	I	N/A	A	Low	Sand, silt, and pumice gravel
97	Very stable	N/A	Unchanged	Low	I	I	A	Low	Sand, silt, and pumice gravel
98	Very stable	N/A	Unchanged	Low	I	I	A	Low	Sand, silt, and pumice gravel
1A	Moderately stable to stable	Slides and rockfall	Increased	High to Moderate	II	I	B	Low to moderate	Sand, silt, and pumice gravel
2A	Very stable	N/A	Unchanged	Low	I-II	N/A	A-B	Low	Sand, silt, and pumice gravel
2B	Very stable	N/A	Unchanged	Low to moderate	I	N/A	A	Low	Sand and pumice gravel
4A	Very stable	N/A	Unchanged	Moderate	I	N/A	A	Moderate	Sand, silt, and pumice gravel
4C	Very stable	N/A	Unchanged	High	II	N/A	B	Moderate	Sand, silt, and clay
5A	Stable	Small slides and ravel	Increased	High	II	II	B-D	Moderate	Sand, silt, and pumice gravel
6A	Very stable	N/A	Unchanged		I-II	I	B	Low	Sand, silt, and pumice gravel
6B	Very stable	N/A	Unchanged	Low	I-II	I	B	Low	Sand, silt, and pumice gravel
6C	Very stable	N/A	Unchanged	Low to moderate	II	I	B	Moderate	Sand, silt, and clay
6E	Stable	Ravel	Increased	Low to moderate	I	I	A	Moderate to low	Sand, pumice gravel, and silt
6G	Very stable	N/A	Unchanged	Low	I	I	A-B	Low (accumulation site)	Sand and silt
6H	Very stable	N/A	Unchanged	Low to moderate	I	I	A B	Low	Sand, silt, and pumice gravel
6J	Very stable	N/A	Unchanged	Low	I	I	A-B	Low	Sand, pumice gravel, and silt
7A	Very stable	N/A	Unchanged	Low	I	I	A-B	Low	Sand, pumice gravel, and silt
7B	Very stable	N/A	Unchanged	Low	I	I	A-B	Low	Pumice gravel and sand
7C	Very stable	N/A	Unchanged	Low	I	I	A-B	Low	Pumice gravel and sand
7E	Very stable	N/A	Unchanged	Low to moderate	I-II	I	A-B	Low	Sand, silt, and pumice gravel
7F	Very stable	N/A	Unchanged	Low to moderate	I-II	I	A-B	Low	Sand, silt, and pumice gravel
7G	Stable	Ravel	Increased	Low to moderate	I	I	A	Low	Pumice gravel and sand
7H	Very stable	Ravel	Increased	Moderate	II	I-II	B	Moderate	Sand, silt, and clay

1/ Wind erosion has not been rated in this section although it could be a problem Forest-wide. There is also movement of surface soil by dry ravel (or surface creep), frost action, and saturated flow above a frozen layer.

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

EROSION AND HYDROLOGIC INTERPRETATIONS

Land-type No.	Natural Stability	Nature of Mass Movement	Expected Mass Movement as a Result of Man's Activities	Surface Soil Erosion Potential 1/	Water Yield Class	Bedrock Hydrologic Characteristics	Hydrologic Group	Sedimentation Yield Potential	Expected Sediment Size
7J	Very stable	N/A	Unchanged	Low	I	N/A	A	Low	Pumice gravel and sand
7K	Very stable	N/A	Unchanged	Moderate	II	I-II	B	Moderate	Sand, silt, and clay
7T	Very stable	N/A	Unchanged	Moderate	II	I-II	B	Moderate	Sand, silt, and clay
8A	Stable	Small slides and ravel	Increased	Moderate to high	I	I	A-B	Moderate	Sand, silt, and pumice gravel
8B	Very stable	N/A	Unchanged	Low to moderate	I	I	A-B	Low to moderate	Sand, silt, and pumice gravel
8C	Stable	Small debris slides and ravel	Increased	Moderate to high	I-II	I-II	A-B	Low to moderate	Sand, silt, and pumice gravel
8P	Stable	Ravel	Increased	Moderate	I	I	A	Low	Sand and pumice gravel
8T	Stable	Small slides and ravel	Increased	Moderate to high	I-II	II	B-D	Moderate	Sand and pumice gravel
9A	Stable	Ravel	Increased	High to moderate	I	I	A	Moderate to low	Sand, pumice gravel, and silt
9B	Stable	Ravel	Increased	High to moderate	I	I	A	Moderate to low	Sand, pumice gravel, and silt
9C	Stable	Ravel	Increased	High to moderate	I	I	A	Moderate to low	Sand, pumice gravel, and silt
9F	Very stable	N/A	Unchanged	Low to moderate	I	I	A	Low	Sand and pumice gravel
9G	Very stable	N/A	Unchanged	Low to moderate	I	N/A	A	Low	Sand and pumice gravel
9J	Stable	Small slumps and ravel	Increased	Moderate	I	N/A	A	Low to moderate	Sand and pumice gravel
9K	Very stable	N/A	Unchanged	Low	I	N/A	A	Low	Pumice gravel and sand
9L	Very stable	--	Unchanged	Low	I	N/A	A	Low	Pumice gravel and sand
9M	Very stable	--	Unchanged	Low to moderate	I	N/A	A	Low	Pumice gravel and sand
9N	Stable	Ravel	Increased	High to moderate	I	N/A	A	Low to moderate	Pumice gravel and sand
9P	Moderately stable to unstable	Slides, slumps, and ravel	Greatly increased	High to moderate	I-II	N/A	A	Low to moderate	Pumice gravel and sand
9R	Moderately stable	Slumps, slides, and ravel	Increased	High to moderate	I	N/A	A	Low to moderate	Pumice gravel and sand
9S	Moderately stable	Small slumps and ravel	Increased	High to moderate	I	N/A	A	Low to moderate	Pumice gravel and sand
9T	Moderately stable	Ravel	Increased	Moderate to high	I	N/A	A	Low to moderate	Pumice gravel and sand
9U	Very stable	N/A	Unchanged	Low	I	I	A	Low	Pumice gravel and sand
9V	Very stable	N/A	Unchanged	Low	I	I	A	Low	Pumice gravel and sand
9W	Very stable	N/A	Unchanged	Low	I	N/A	A	Low	Pumice gravel and sand
9X	Stable	Ravel	Increased	Moderate	I	I	A	Low	Pumice gravel and sand
9Y	Moderately stable	Slumps and ravel	Increased	Moderate	I	N/A	A	Low to moderate	Pumice gravel and sand
9Z	Stable	Ravel	Increased	High to moderate	I	I	A	Moderate to low	Pumice gravel and sand

1/ Wind erosion has not been rated in this section although it could be a problem Forest-wide. There is also movement of surface soil by dry ravel (or surface creep), frost action, and saturated flow above a frozen layer.

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

INTERPRETATIONS FOR TIMBER MANAGEMENT

Land-type	Suitability for Timber Management	Susceptibility to Brush Competition	Susceptibility to Sedge or Grass Competition	Potential for Regeneration	Limitations to Regeneration	Suggested Tree Planting Species
1	Unsuited (nonforest)	N/A	N/A	N/A	N/A	N/A
2	Variable, but generally very low	Moderate	High to moderate	Low to moderate	High elevations, short season	Lodgepole pine
3	Unsuited (nonforest)	N/A	N/A	N/A	N/A	N/A
4	Unsuited (unproductive)	N/A	N/A	N/A	N/A	N/A
5	Unsuited (nonforest)	N/A	N/A	N/A	N/A	N/A
6	Very low to unsuited (low productivity, steep slopes)	Low to moderate	Low	Low	Steep slopes, exposed aspects	Lodgepole pine
7	Unsuited (nonforest)	N/A	N/A	N/A	N/A	N/A
8	Low to moderate (wetness)	Moderate	Moderate	Moderate	Shallow depth to watertable on some sites, local stoniness, periodic flooding	Species selection depends on depth to watertable, consider ponderosa pine, Douglas-fir, lodgepole pine, white fir, and Englemann spruce
9	Unsuited (nonforest to very low productivity)	N/A	N/A	N/A	N/A	N/A
10	Low (steep slopes)	Moderate	Moderate	Low to moderate	Steep slopes, some droughty aspects	Ponderosa pine
11	Unsuited (rough lava flows, unproductive)	Low	Low	Low	Stoniness, lack of soil	N/A
12	Very low (low productivity)	Low	Low	Low	Harsh climatic conditions, high elevations	Lodgepole pine
13	Unsuited (unproductive)	Low	Low	Low	Harsh climate, stony soils, high elevations, steep slopes	N/A
14	Low (steep slopes)	High to moderate	Low	Low to moderate	Droughty, high summer temperatures on south aspects	Ponderosa pine
15	Unsuited to very low (very low productivity)	Low	Low	Low	Frost heaving, low fertility, temperature extremes	Lodgepole pine
16	Very low (low productivity)	Low to moderate	Low	Low	Harsh climate, low fertility	Lodgepole pine
17	Very low (low productivity)	Low	Moderate	Low	Harsh climate, low fertility	Lodgepole pine
18	Very low (low productivity, steep slopes)	Moderate	Low	Low	Harsh climate, high elevation, steep slopes	Lodgepole pine
19	Low to moderate	Low	Moderate	Low to moderate	High gopher populations are often present, droughtiness	Lodgepole pine
20	Very low (low productivity)	Low	Moderate	Low to moderate	Harsh climate, some steep slopes, and rocky land	Lodgepole pine
21	Low to moderate (steep slopes)	Moderate	Low to moderate	Moderate	Steep slopes, exposed aspects	Ponderosa pine
22	Moderate (steep slopes)	High	Moderate	High	Steep slopes, brush competition	Ponderosa pine Douglas-fir White fir
23	Moderate (steep slopes)	High	Moderate	High	Steep slopes, loose soils	Ponderosa pine Douglas-fir
24	Low (steep slopes, stability problems)	High to moderate	Moderate	High	Steep slopes, brush, and sedge competition	Ponderosa pine Douglas-fir White fir
25	Moderate	Moderate to high	Moderate	High to moderate	Some droughty south aspects	Ponderosa pine White fir

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

INTERPRETATIONS FOR TIMBER MANAGEMENT

Land-type	Suitability for Timber Management	Susceptibility to Brush Competition	Susceptibility to Sedge or Grass Competition	Potential for Regeneration	Limitations to Regeneration	Suggested Tree Planting Species
26	Moderate	Moderate	Moderate	Moderate to high	Brush competition, droughtiness	Ponderosa pine
27	Moderate	High	Moderate	Moderate	Brush competition, some droughty sites	Ponderosa pine
28	Moderate (some steep slopes)	High to moderate	Moderate	High to moderate	Some sites have high gopher populations	Ponderosa pine
29	High	Low to moderate	High to moderate	High to moderate	Competition with grasses, locally high gopher populations	Ponderosa pine
30	Moderate (wetness)	High	Moderate	High to moderate	Competition with brush and grasses, wetness	Douglas-fir White fir Ponderosa pine
31	Very low (low productivity, steep slopes)	Moderate to low	Low	Low to moderate	Steep slopes, low fertility, high elevations	Mtn. hemlock Lodgepole pine White pine
32	High to moderate	High	Moderate	High	Brush competition and droughty soils	Ponderosa pine
33	Moderate	High to moderate	Low	Moderate	Cindery soils	Ponderosa pine Douglas-fir White pine
34	Low to moderate (steep slopes and cindery soils)	High to moderate	Low	Moderate	Cindery soils, steep slopes	White fir Ponderosa pine Douglas-fir
35	Low (steep slopes)	High to moderate	Low to moderate	Moderate	Steep southerly aspects, high surface temperatures, droughtiness	Ponderosa pine
36	Very low (low productivity)	Moderate	Moderate	Low	Droughtiness, low precipitation	Ponderosa pine
37	High to moderate	High to moderate	Moderate	Moderate to high	Droughty conditions, especially at lower elevational limits	Ponderosa pine
38	Low to moderate (steep slopes)	Moderate	Low	Moderate	Steep slopes, coarse soils	Ponderosa pine
39	High	Moderate	Moderate	Moderate to high		Ponderosa pine
40	Moderate (limited by wetness and periodic flooding)	Moderate	High	Moderate	Competition by grasses and forbs	Ponderosa pine Douglas-fir Larch
41	Moderate	High to moderate	Moderate	Moderate	Droughtiness	Ponderosa pine
42	High	High to moderate	Low	High to moderate	Droughtiness and brush competition	Ponderosa pine Lodgepole pine
43	Low to very low (high water table)	Low	High	Moderate	High watertable	Lodgepole pine
44	Moderate to high	Moderate	Moderate	High to moderate	Surface temperature extremes after clearing, potential for gophers	Lodgepole pine
45	Moderate	Moderate	Low to moderate	Low to moderate	Surface temperature extremes after clearing	Lodgepole pine
46	Low (relatively low productivity)	Low	Low	Low to moderate	Surface temperature extremes after clearing	Lodgepole pine
47	Very low (low productivity)	Low	Moderate	Low	Droughtiness, frost	Lodgepole pine
48	Unsuited (nonforest)	N/A	N/A	N/A	N/A	N/A
49	Unsuited (nonforest)	N/A	N/A	N/A	N/A	N/A
50	Very low to unsuited (low productivity, steep slopes)	Low	High to moderate	Low	Shallow, droughty soils on steep slopes	Ponderosa pine
51	Low (steep slopes)	Moderate	Moderate	Moderate	Steep slopes, droughtiness	Ponderosa pine
52	Low (steep slopes)	High	Low	High to moderate	Some brush competition, steep slopes	Ponderosa pine

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

INTERPRETATIONS FOR TIMBER MANAGEMENT

Land-type	Suitability for Timber Management	Susceptibility to Brush Competition	Susceptibility to Sedge or Grass Competition	Potential for Regeneration	Limitations to Regeneration	Suggested Tree Planting Species
53	Unsuited (very low productivity to unproductive)	Low	Low	Low	Very shallow soils, droughtiness	Juniper Ponderosa pine
54	Moderate to high	High to moderate	High to moderate	High	Competition with brush and grasses	Ponderosa pine
55	Moderate to low	Moderate	Moderate	Moderate	Droughtiness, soil compaction after exposed to heavy traffic	Ponderosa pine
56	Low (low productivity)	High	Moderate	Moderate to low	Droughtiness	Ponderosa pine
57	Low (steep slopes)	High	Low to moderate	Moderate	Droughtiness, steep slopes	Ponderosa pine
58	Low to moderate (steep slopes)	High	Low	High to moderate	Steep slopes, droughty summers	Ponderosa pine
59	Low (steep slopes, south aspects)	High	Moderate	Moderate	Steep slopes, droughtiness	Ponderosa pine
60	Low	Moderate	Moderate to high	Low	Droughtiness, low precipitation	Ponderosa pine
61	Moderate	High	Moderate	Moderate to high	Droughty summers	Ponderosa pine
62	High	High to moderate	High to moderate	High to moderate	Gopher populations are often high	Ponderosa pine
63	Moderate	Moderate	Moderate	Moderate	Frost, droughtiness, competition with grasses	Lodgepole pine
64	High to moderate	High to moderate	Moderate	Moderate	Brush competition	Ponderosa pine
65	High	High to moderate	Moderate	Moderate to high	Competition by sedges and brush	Ponderosa pine
66	High	Moderate	Low to moderate	Moderate	Droughtiness, brush competition	Ponderosa pine
67	High	Moderate to high	Moderate to high	High	Brush competition	Ponderosa pine
68	Low to moderate	High	Low	Moderate	Steep slopes with e south aspect, droughtiness, brush competition	Ponderosa pine
69	Low to moderate	High to moderate	Moderate	High to moderate	Brush competition	Ponderosa pine
70	Moderate	Low	Low	Moderate	Frost damage, coarse soils, low fertility	Lodgepole pine
71	Moderate	Moderate	Moderate	Moderate	Droughtiness, brush competition	Ponderosa pine
72	Low (low site)	Moderate	Moderate to high	Low	Droughtiness, frost hazard, competition with grasses	Ponderosa pine
73	Low to moderate	Low	Moderate to high (Sedges)	Moderate	Gophers, frost hazard, low fertility	Lodgepole pine
74	Low (very stony land)	Moderate	Moderate	Low	Stoniness	Lodgepole pine Ponderosa pine
75	Low to unsuited (very stony land)	Moderate	Moderate	Low	Stoniness, droughtiness, low precipitation zone	Ponderosa pine
76	Low (very stony land)	Moderate	Moderate to low	Low	Stoniness	Ponderosa pine
77	Low (very stony land)	Moderate	Low	Low	Stoniness	Lodgepole pine
78	Low (steep slopes)	High to moderate	Moderate	Moderate	Droughty aspects, brush competition, steep slopes	Ponderosa pine
79	Low to moderate (steep slopes)	High to moderate	Moderate	High	Steep slopes	Ponderosa pine Douglas-fir
80	Unsuited (very low site)	Moderate	High to moderate	Very low	Droughtiness, low precipitation zone	Juniper Ponderosa pine

INTERPRETATIONS FOR TIMBER MANAGEMENT

Land-type	Suitability for Timber Management	Susceptibility to Brush Competition	Susceptibility to Sedge or Grass Competition	Potential for Regeneration	Limitations to Regeneration	Suggested Tree Planting Species
81	Low (steep slopes)	High	Low to moderate	Low to moderate	Brush competition, droughtiness, steep slopes, low fertility	Ponderosa pine
82	Low to moderate (steep slopes)	High	Moderate	High to moderate	Brush competition	Ponderosa pine
83	Very low (steep slopes, high elevations)	Moderate	Moderate to high	Low	Harsh climate, high elevations, steep slopes, low fertility	Lodgepole pine Mountain hemlock White Pine
84	Very low (steep slopes, high elevations)	Low	Moderate	Low	Harsh climate, high elevations, steep slopes, low fertility	Lodgepole pine Mountain hemlock
85	Very low (high elevations)	Low to moderate	Moderate	Low	Harsh climate, high elevations, low fertility	lodgepole pine
86	Moderate to low (steep slopes)	High	Moderate	Moderate to high	Brush competition, steep slopes	Ponderosa pine Douglas-fir Larch
87	Low to moderate (steep slopes)	High	Moderate	Moderate	Brush competition, steep slopes, droughty aspects	Ponderosa pine
88	Very low (steep slopes)	High	Moderate	Moderate	Steep slopes	Ponderosa pine
89	Unsuited to low (steep slopes, some unproductive sites)	High to moderate	Low to moderate	Low to moderate	Steep slopes, shallow soils, local stoniness	Ponderosa pine Douglas-fir Larch
90	Moderate	High to moderate	Moderate	Moderate to high	Brush and grass competition	Ponderosa pine
91	Unsuited (nonforest)	N/A	N/A	N/A	N/A	N/A
92	Very low (very low site)	Low	Low	Low	Frost hazard, cindery soils, low fertility	Lodgepole pine
93	Low to moderate	Moderate	Low	Moderate	Droughtiness, low fertility	Ponderosa pine
94	Low (high elevation)	Moderate to low	Moderate	Low to moderate	Harsh climate, gophers, sandy soil	Lodgepole pine
95	Moderate to high	Moderate	Moderate	High to moderate	Sandy soil, droughtiness	Douglas-fir Ponderosa pine
96	Moderate	Low to moderate	Low	Moderate	Frost, droughtiness, low fertility	Lodgepole pine
97	High	Moderate	Low	High	Brush competition	Ponderosa pine
98	High	High	Moderate	High	Brush competition	Ponderosa pine
1A	Unsuited (steep, rocky slopes at high elevations)	N/A	N/A	N/A	N/A	N/A
2A	Very low (low productivity)	Low	Low	Low	Very coarse pumice soils, low fertility, high elevations	Lodgepole pine
2B	Low (low productivity)	Low to moderate	Low	Low	Harsh climate, coarse pumice soils, low fertility	Lodgepole pine
4A	Low to moderate	Low	Low	Moderate	Gophers, droughtiness	Lodgepole pine
4C	Unsuited (nonforest)	N/A	N/A	N/A	N/A	N/A
5A	Unsuited to very low (steep slopes, unproductive and low productivity)	Moderate	Moderate	Low to moderate	Easily displaced soils, steep slopes, high elevations	Lodgepole pine Mountain hemlock
6A	Low (low productivity)	Moderate to high	Moderate to high	Low to moderate	Droughtiness, competition with grasses and brush	Ponderosa pine
6B	High to moderate	Moderate	Moderate	High	Some frost and droughtiness	Ponderosa pine Lodgepole pine

INTERPRETATIONS FOR TIMBER MANAGEMENT

Land-type	Suitability for Timber Management	Susceptibility to Brush Competition	Susceptibility to Sedge or Grass Competition	Potential for Regeneration	Limitations to Regeneration	Suggested Tree Planting Species
6C	Unsuited (unproductive)	Moderate to high	Moderate to high	Low to moderate	Droughtiness, competition with grasses and brush	Ponderosa pine
6E	Low to very low (some steep slopes)	Low	Low to moderate	Low to moderate	Gophers, low fertility, droughtiness	Lodgepole pine
6G	Low (low productivity)	Moderate to low	Low	Low	Frost hazard, wind erosion, droughtiness	Ponderosa pine
6H	Moderate	Moderate	High to moderate	Moderate	Sedge competition, gophers	Ponderosa pine Lodgepole pine
6J	Moderate	Moderate	Moderate	Moderate to high	Grass and brush competition, droughtiness	Ponderosa pine Lodgepole pine
7A	Very low (low productivity)	Low	Low	Low	Stoniness, high elevations, harsh climate	Lodgepole pine
7B	Very low (low productivity)	Low	Low	Low	Very coarse pumice soils, low fertility, harsh climate	Lodgepole pine
7C	Very low (low productivity)	Low	Low	Low	Very coarse pumice soil, low precipitation	Lodgepole pine
7E	Low	Low	Low	Low to moderate	Low fertility, droughtiness, frost hazard	Lodgepole pine
7F	Low (low productivity, high elevation)	Low	Low	Low to moderate	Harsh climate, high elevation	Lodgepole pine
7G	Very low (low productivity, steep slopes)	Low	Low	Low	Very coarse pumice soils, high elevations, some steep slopes	Lodgepole pine
7H	Low (steep slopes)	Low	Moderate	Moderate	Droughtiness, steep slopes	Ponderosa pine
7J	Very low (low productivity)	Low	Low	Low	Very coarse pumice soils, low precipitation	Lodgepole pine
7K	Low to very low (low productivity)	Moderate	Moderate	Low	Droughtiness, low precipitation, steep slope, competition with brush and grasses	Ponderosa pine
7T	Unsuited (nonforest)	N/A	N/A	N/A	N/A	N/A
8A	Low (high elevations, steep slopes)	Low	Moderate	Low to moderate	Harsh climate, low fertility, steep slopes	Lodgepole pine White pine Shasta red fir
8B	Low (high elevations, low productivity)	Low	Moderate	Low	Harsh climate, coarse pumice soils of low fertility, frost heaving	Lodgepole pine White pine Shasta red fir
8C	Unsuited (low productivity, steep slopes, high elevation)	Low	Low to moderate	Low	Harsh climate, low fertility, coarse soils, steep slopes	Lodgepole pine
8E	Unsuited (low productivity, erosive soils)	Low	Low	Low	Steep slopes, erosive soils, frost heaving, low fertility	Lodgepole pine
8P	Very low to unsuited (low productivity, high elevations)	Low	Low	Low	Very coarse pumice soils, high elevations, low fertility, steep slopes	Lodgepole pine
8T	Very low to unsuited (low productivity)	Low to moderate	Low	Low	Coarse pumice soils on steep slopes, shallow in many spots, low fertility, droughtiness	Lodgepole pine at high elevations, Ponderosa pine at lower elevations
9A	Low to moderate (coarse pumice soils on steep slopes)	High	Low	Moderate to high	Low fertility, coarse pumice soil	Ponderosa pine Douglas-fir

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

INTERPRETATIONS FOR TIMBER MANAGEMENT

Land-type	Suitability for Timber Management	Susceptibility to Brush Competition	Susceptibility to Sedge or Grass Competition	Potential for Regeneration	Limitations to Regeneration	Suggested Tree Planting Species
9B	Low to moderate (steep slopes, coarse pumice soils)	High	Low	High to moderate	Low fertility, loose soils on steep slopes	Ponderosa pine Douglas-fir
9C	Low to moderate (steep slopes, coarse pumice soils)	High	Low	High to moderate	Droughtiness due to exposed aspects, steep slopes, low fertility	Ponderosa pine
9F	High to moderate (coarse pumice soils)	High to moderate	Low	High to moderate	Some frost heaving, low fertility, droughtiness	Ponderosa pine Lodgepole pine
9G	High to moderate (coarse pumice soils)	High	Low	High	Coarse soils, some frost heaving	Ponderosa pine
9J	Low to moderate (coarse pumice soils on steep slopes)	High	Low	High to moderate	Brush competition, loose soils, steep slopes	Ponderosa pine Douglas-fir
9K	Very low (low productivity)	Low	Low	Low	Harsh climate, low fertility, coarse pumice soils	Lodgepole pine
9L	Moderate (coarse pumice soils)	Moderate to high	Low to moderate	High to moderate	Coarse pumice soils, low fertility, droughtiness	Ponderosa pine Lodgepole pine
9M	Moderate (coarse pumice soils)	High	Low	High to moderate	Coarse pumice soils	Ponderosa pine Lodgepole pine Douglas-fir
9N	Low (coarse pumice soils on steep slopes)	High	Low	Moderate to low	Coarse pumice soils, low fertility, steep slopes	Ponderosa pine Douglas-fir Shasta red fir
9P	Very low (coarse pumice soils on steep slopes)	Moderate	Low	Low to moderate	Loose, coarse pumice soils on steep slopes, low fertility, high elevations	Douglas-fir at lower elevation limits; Lodgepole pine, Shasta red fir, or White pine
9R	Low (coarse pumice soils on steep slopes)	High	Low	Low to moderate	Coarse pumice soils, droughtiness, low fertility, steep slopes, high surface temperatures	Ponderosa pine
9S	Low (coarse pumice soils on steep slopes)	High	Low	Moderate	Coarse pumice soils on steep slopes, droughtiness, low fertility	Ponderosa pine
9T	Low (coarse pumice soils on steep slopes)	High	Low	Moderate	Loose, coarse pumice soils, steep slopes, droughtiness, low fertility	Ponderosa pine
9U	Low to very low (very coarse pumice soils)	Low	Low	Low	Low fertility, very coarse pumice soils, frost hazard, droughtiness	Lodgepole pine
9V	Very low (rocky land)	Low	Low	Low	Very coarse pumice soils on rough, rocky land; low fertility; droughtiness	Lodgepole pine
9W	Very low (low productivity)	Low	Low	Moderate to low	Coarse pumice soils, frost hazard, low fertility	Lodgepole pine
9X	Very low (low productivity)	Low	Low	Low	Very coarse pumice soils, low fertility, droughtiness, relatively steep slopes	Lodgepole pine
9Y	Very low (low productivity)	Moderate	Low to moderate	Low	Harsh climate, coarse pumice soils	Lodgepole pine
9Z	Low to moderate (steep slopes, pumice soils)	High	Low	High to moderate	Coarse soils on steep slopes	Ponderosa pine Douglas fir

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

PART 1
INTERPRETATIONS FOR TIMBER MANAGEMENT
SOIL & WATER IMPACTS FROM VARIOUS TIMBER HARVEST METHODS

Land-type No.	Impact from Tractor Logging 1/	Type of Damage	Impact from Cable (no suspension)	Type of Damage
1	N/A	N/A	N/A	N/A
2	High to moderate	Rutting due to wet and muddy conditions, some soil displacement and erosion	Moderate	Erosion on skid trails, soil displacement
3	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A
5	N/A	N/A	N/A	N/A
6	High	Soil displacement, erosion on skid trails, impact from roading	High	Erosion on skid trails, soil displacement, impact from roading and landing locations
7	N/A	N/A	N/A	N/A
8	High to moderate	Soil displacement and erosion, increased sedimentation in streams	High to moderate	Soil displacement and erosion, some increase in sedimentation
9	N/A	N/A	N/A	N/A
10	High to moderate	Soil displacement	Moderate	Soil displacement
11	Low	Soil displacement	Low	Soil displacement
12	High to moderate	Soil displacement	Moderate	Soil displacement
13	N/A	N/A	N/A	N/A
14	High to moderate	Soil displacement	Moderate	Soil displacement
15	Low to moderate	Compaction, soil displacement	Low to moderate	Soil displacement
16	Moderate to low	Soil displacement	Moderate	Soil displacement and gouging
17	Moderate to low	Soil displacement, some compaction	Moderate	Soil displacement and gouging
18	High	Soil displacement	High	Soil displacement
19	Moderate to low	Soil displacement, some compaction, erosion along roads	Moderate to low	Soil displacement and gouging on skid trails
20	Moderate to low	Soil displacement, erosion, increased sedimentation of waterbodies	Moderate	Soil displacement, erosion, increased sedimentation
21	High	Soil displacement	High to moderate	Soil displacement and gouging on skid trails
22	High	Soil displacement	Moderate to high	Soil displacement and gouging on skid trails
23	High	Soil displacement, erosion	High to moderate	Soil displacement, erosion, and gouging on skid trails
24	High	Soil displacement, erosion, some stability problems along roads, wet spots may be disrupted	High	Soil displacement and gouging on skid trails, seepy spots may be disrupted and cause erosion
25	Moderate to low	Soil displacement, high visual impact due to light colored soils	Moderate	Soil displacement and gouging on skid trails, high visual impact
26	Moderate	Soil displacement	Moderate	Soil displacement and gouging on skid trails
27	High to moderate	Soil displacement, soil disturbance. Logging will relate to an increase in brush	High to moderate	Soil displacement and gouging on skid trails, will result in increased erosion
28	Moderate	Soil displacement and erosion on skid trails, erosion on roads	Moderate	Soil displacement, gouging on skid trails and erosion
29	Low	Soil displacement, some compaction	Low to moderate	Soil displacement and gouging on skid trails
30	High to moderate	Soil compaction and rutting when soils are wet, increased erosion and sedimentation of streams is likely	High to moderate	Gouging on skid trails may increase erosion by providing channels for runoff
31	High	Soil displacement, high visual impact due to exposure of light colored pumice soils, may disrupt wet spots	High	Soil gouging, ravelling, high visual impact
32	Moderate to low	Soil displacement, compaction. Logging activity will stimulate brush growth	Moderate	Soil gouging and displacement
33	Low	Soil displacement	Low to moderate	Soil gouging and displacement
34	High to moderate	Soil displacement, ravelling	High to moderate	Soil displacement and gouging on skid trails
35	High	Soil displacement, visual impact with exposure of light colored soil	High	Soil displacement and gouging on skid trails, visual impact
36	Low	Some soil compaction and displacement	Low to moderate	Soil displacement and gouging on skid trails
37	Low	Soil displacement and compaction	Low to moderate	Soil displacement and gouging on skid trails
38	High	Soil displacement, visual impact related to the exposure of light colored soils	High	Soil displacement and gouging on skid trails, visual impact
39	Low	Soil displacement and compaction	Low to moderate	Soil displacement and gouging on skid trails
40	High to moderate	Erosion of exposed soil during spring runoff periods, increased sedimentation of streams, some soil compaction	High to moderate	Soil displacement and gouging, erosion in skid trails during runoff periods, increased sedimentation of streams
41	Moderate to low	Soil displacement, some compaction and erosion	Moderate	Soil displacement and gouging
42	Moderate to low	Soil displacement, some compaction and erosion	Moderate	Soil displacement and gouging
43	High to moderate	Limited by wetness, logging activity will cause rutting and soil displacement, disruption of drainage systems, increased sedimentation	High	Soil displacement and gouging on skid trails will disrupt the drainage system and cause increased erosion and sedimentation

1/ Impacts from tractor logging are rated for skidding with one end of the log being suspended and the harvest being complete or nearly complete. This interpretation was made by considering a machine such as a D-6 crawler Caterpillar as a standard. Other machines may have more or less impact depending on size, ground pressure exerted, and other features.

SOIL RESOURCE INVENTORY
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PART 2
INTERPRETATIONS FOR TIMBER MANAGEMENT
SOIL & WATER IMPACTS FROM VARIOUS TIMBER HARVEST METHODS

Land-type No.	Impact from Cable (partial suspension)	Type of Damage	Impact from Cable (full suspension)	Type of Damage	Impact from Ground Logging	Type of Damage
1	N/A	N/A	N/A	N/A	N/A	N/A
2	Low to moderate	Some erosion on skid trails, and soil displacement	Low	N/A	Low	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A
5	N/A	N/A	N/A	N/A	N/A	N/A
6	Moderate	Soil displacement and erosion on skid trails, impacts from roading and landing construction	Moderate	Impacts from roading and landing locations	Low	N/A
7	N/A	N/A	N/A	N/A	N/A	N/A
8	Moderate	Soil displacement, rutting, and erosion; increased sedimentation of streams	Low	Removal of timber near the stream may cause water temperature increases	Low	Removal of timber along streams may cause water temperature increases
9	N/A	N/A	N/A	N/A	N/A	N/A
10	Low to moderate	Soil displacement	Low	2/	Low	2/
11	Low	Minor soil displacement	Low	No significant damage	Low	No significant damage
12	Moderate	Soil displacement	Low	2/	Low	2/
13	N/A	N/A	N/A	N/A	N/A	N/A
14	Moderate	Soil displacement	Low	2/	Low	2/
15	Low	Soil displacement	Low	2/	Low	2/
16	Low	Soil displacement	Low	2/	Low	2/
17	Low	Soil displacement	Low	2/	Low	2/
18	Moderate	Soil displacement	Low to moderate	Erosion along roads	Low	2/
19	Low	Soil displacement	Low	2/	Low	2/
20	Low to moderate	Soil displacement, erosion, increased sedimentation	Low to moderate	Sedimentation due to erosion from roads	Low	Some erosion along roads, and increased sedimentation
21	Moderate	Soil displacement	Low	2/	Low	2/
22	Moderate	Soil displacement	Low	2/	Low	2/
23	Moderate	Soil displacement and erosion associated with roads	Low	Erosion associated with roads	Low	Erosion on roads and landings
24	Moderate	Soil displacement, erosion along skid trails and roads	Low to moderate	Erosion and stability problems along roads	Low	Some erosion along roads and off landings
25	Low to moderate	Soil displacement on skid trails	Low	Impacts associated with roads, erosion	Low	2/
26	Low to moderate	Soil displacement on skid trails	Low	2/	Low	2/
27	Moderate	Soil displacement and erosion on skid trails, impact from roading	Low	Some erosion associated with roads	Low	2/
28	Low to moderate	Some soil displacement on skid trails and erosion along roads, disturbance may relate to increases in gophers	Low	Impacts are related primarily to some erosion along roads	Low	2/
29	Low	Minor soil displacement, erosion, and compaction	Low	2/	Low	2/
30	Low to moderate	Primary impacts will relate to erosion along roads, some increases in erosion along skid trails	Low	Erosional impacts associated with roads	Low	2/
31	Moderate to high	Soil displacement, visual impact with exposure of pumice soils	Low to moderate	Ravelling and visual impacts associated with roads	Low	2/
32	Low	Some soil displacement	Low	2/	Low	2/
33	Low	Some soil displacement	Low	2/	Low	2/
34	Moderate	Soil displacement	Low	2/	Low	2/
35	Moderate	Soil displacement	Low	2/	Low	2/
36	Low	2/	Low	2/	Low	2/
37	Low	2/	Low	2/	Low	2/
38	Moderate	Soil displacement and soil exposure on skid trails, visual impact	Low	2/	Low	2/
39	Low	2/	Low	2/	Low	2/
40	Low to moderate	Some soil displacement and erosion	Low	Removal of timber may relate to a rise in the watertable on this landtype		2/
41	Low	2/	Low	2/	Low	2/
42	Low	2/	Low	2/	Low	2/
43	Moderate	Soil displacement and erosion along skid trails	Low to moderate	2/	Low	2/

2/ Impacts will be similar to, or less significant, than described for systems to the left in the table. Some soil displacement, microclimatic changes, and impacts related to roads and landings can be expected.

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PART 1
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SOIL & WATER IMPACTS FROM VARIOUS TIMBER HARVEST METHODS

Land-type No.	Impact from Tractor Logging 1/	Type of Damage	Impact from Cable (no suspension)	Type of Damage
44	Low to moderate	Soil compaction	Moderate	Soil displacement and gouging on skid trails
45	Moderate to low	Soil displacement, some soil compaction, complete timber removal will relate to some regeneration difficulties due to frost problems	Moderate	Soil displacement and gouging on skid trails
46	Moderate to low	Soil displacement, compaction	Moderate	Soil displacement and gouging on skid trails
47	Moderate to low	Soil displacement, some compaction where activity is concentrated	Moderate	Soil displacement and gouging on skid trails
48	N/A	N/A	N/A	N/A
49	N/A	N/A	N/A	N/A
50	High	Soil displacement, erosion, decreases in soil depth will limit revegetation, visual impact, increased sedimentation of streams	High	Soil displacement, gouging of skid trails, erosion, visual impact, likely to cause increased sedimentation of streams
51	High to moderate	Soil displacement, erosion on skid trails, may increase sedimentation of streams, high visual impact in some spots	High to moderate	Soil displacement, gouging and erosion of skid trails, likely to cause an increase in sedimentation of streams, high visual impact on some spots
52	High	Soil displacement and erosion, may cause increased sedimentation of streams, high visual impact on some sites	High	Soil displacement and gouging of skid trails, erosion, probable increase in sedimentation of streams, high visual impacts on some sites where bedrock is light colored
53	High to low	Compaction and rutting will occur on some of these sites when soils are wet	N/A	N/A
54	Moderate to low	Soil compaction and displacement	Moderate	Soil displacement and gouging of skid trails
55	Moderate	Soil compaction, displacement, erosion on skid trails and roads	Moderate	Soil displacement, gouging, compaction, and erosion in skid trails
56	Moderate to low	Soil displacement, high visual impact by exposure of light colored pumice	Moderate	Soil displacement and gouging of skid trails, reduced potential for regeneration and tree growth due to removal of surface soil
57	High	Soil displacement and mixing, high visual impact	High	Soil displacement and gouging of skid trails, high visual impact, reduced regeneration and tree growth potential
58	High	Soil displacement, exposure of light colored pumice soils, high visual impact	High	Soil displacement and gouging of skid trails, visual impacts, reduced growth potential in skid trails
59	High	Soil displacement	High	Soil displacement and gouging of skid trails
60	Low to moderate	Soil compaction, especially when soils are wet	Low to moderate	Soil displacement, gouging, and compaction on skid trails
61	Moderate to low	Soil displacement and compaction, some erosion	Moderate to low	Soil displacement and gouging in skid trails
62	Moderate to low	Soil displacement and compaction, some erosion	Moderate to low	Soil displacement and gouging in skid trails
63	Moderate to low	Soil displacement and compaction, exposure of light colored pumice soils, visual impact	Moderate	Soil displacement and gouging
64	Moderate to low	Soil displacement, exposure of light colored pumice soils, some compaction	Moderate	Soil displacement and gouging on skid trails
65	Moderate to low	Soil displacement and exposure of light colored pumice soils, some compaction	Moderate	Soil displacement and gouging on skid trails
66	Moderate to low	Soil displacement, exposure of light colored pumice soils, some compaction	Moderate	Soil displacement and gouging on skid trails
67	Moderate to low	Soil displacement, exposure of light colored soils	Moderate	Soil displacement and gouging of skid trails
68	High	Soil displacement, visual impact, exposure of light colored pumice soils, disturbance will cause an increase in brush	High	Soil displacement and gouging of skid trails, high visual impact, reduced productivity
69	High	Soil displacement, exposure of light colored pumice soils of low fertility, visual impact	High	Soil displacement and gouging of skid trails, high visual impact, reduced productivity
70	Moderate to low	Soil displacement, compaction, micro-climatic changes, increased frost problems with clearing	Moderate	Soil displacement and gouging of skid trails
71	Moderate	Displacement of surface soil and organic layers, erosion on skid trails, landings, and roads, compaction	Moderate	Gouging of skid trails, erosion on roads and skid trails
72	Low to moderate	Soil displacement and erosion	Moderate	Soil displacement and gouging of skid trails
73	Low to moderate	Soil displacement and compaction	Moderate to low	Soil displacement and gouging of skid trails
74	Low	Regeneration difficulties after harvest due to stoniness	Low	Regeneration difficulties after harvest due to stoniness
75	Low	Regeneration difficulties after harvest due to stoniness	Low	Regeneration difficulties after harvest due to stoniness
76	Low	Soil displacement, some visual impacts	Low to moderate	This system would be difficult due to the stoniness of the land
77	Low	Soil displacement	Low to moderate	Soil displacement. This system would be difficult to use due to the stoniness of the land

1/ Impacts from tractor logging are rated for skidding with one end of the log being suspended and the harvest being complete or nearly complete. This interpretation was made by considering a machine such as a D-6 crawler Caterpillar as a standard. Other machines may have more or less impact depending on size, ground pressure exerted, and other features.

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Land-type No.	Impact from Cable (partial suspension)	Type of Damage	Impact from Cable (full suspension)	Type of Damage	Impact from Aerial Logging	Type of Damage
44	Low	2/	Low	2/	Low	2/
45	Low	2/	Low	2/	Low	2/
46	Low	Some soil displacement	Low	2/	Low	2/
47	Low	Some soil displacement	Low	2/	Low	2/
48	N/A	N/A	N/A	N/A	N/A	N/A
49	N/A	N/A	N/A	N/A	N/A	N/A
50	High to moderate	Soil displacement and erosion on skid trails	Low	Impacts will relate to roads if they are needed within this landtype. Mostly a visual impact.	Low	2/
51	Low to moderate	Soil displacement and erosion on skid trails	Low	2/	Low	2/
52	Moderate	Soil displacement and erosion associated with skid trails and roads	Low	Damage is related to erosion along roads and on landings	Low	2/
53	N/A	N/A	N/A	N/A	N/A	N/A
54	Low	Some soil displacement and erosion	Low	2/	Low	2/
55	Low	Some soil displacement and removal of surface organic layers, minor erosion	Low	2/	Low	2/
56	Low	Some soil displacement and removal of surface organic layers	Low	2/	Low	2/
57	Moderate	Soil displacement, impacts associated with roads, visual impact	Low	Impacts related to roading	Low	2/
58	Moderate to low	Some soil displacement and removal of organic matter in skid trails	Low	2/	Low	2/
59	Moderate	Some soil displacement, removal of organic matter and erosion on skid trails	Low	2/	Low	2/
60	Low	2/	Low	2/	Low	2/
61	Low	Soil displacement	Low	2/	Low	2/
62	Low	Soil displacement	Low	2/	Low	2/
63	Low	Soil displacement	Low	2/	Low	2/
64	Low	Soil displacement on skid trails	Low	2/	Low	2/
65	Low	Soil displacement on skid trails	Low	2/	Low	2/
66	Low	Soil displacement on skid trails	Low	2/	Low	2/
67	Low	Soil displacement on skid trails	Low	2/	Low	2/
68	Moderate	Soil displacement on skid trails	Low to moderate	Visual impact from roads, the removal of trees on these hot sites may limit reforestation potentials and increase brush competition	Low	2/
69	Moderate to low	Soil displacement on skid trails	Low	Removal of trees will cause an increase in brush competition. Visual impact and ravelling on roads	Low	2/
70	Low	Soil displacement	Low	2/	Low	2/
71	Low	Minor erosion on skid trails, erosion along roads	Low	2/	Low	2/
72	Low	Soil displacement	Low	2/	Low	2/
73	Low	Soil displacement	Low	2/	Low	2/
74	Low	2/	Low	2/	Low	2/
75	Low	2/	Low	2/	Low	2/
76	Low	2/	Low	2/	Low	2/
77	Low	2/	Low	2/	Low	2/

2/ Impacts will be similar to, or less significant, than described for systems to the left in the table. Some soil displacement, microclimatic changes, and impacts related to roads and landings can be expected.

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SOIL & WATER IMPACTS FROM VARIOUS TIMBER HARVEST METHODS

Land type No.	Impact from Tractor Logging 1/	Type of Damage	Impact from Cable (no suspension)	Type of Damage
78	High to moderate	Soil displacement, erosion on skid trails, timber removal on these exposed slopes will cause increases in surface temperatures	High	Soil displacement, gouging and erosion on skid trails
79	High to moderate	Soil displacement and erosion on skid trails, possible increase in sedimentation of streams	High	Soil displacement, gouging, and erosion on skid trails, likely to increase sedimentation of streams
80	High to moderate	Soil displacement	High	Soil displacement
81	High	Soil displacement, high visual impact due to exposure of light colored soils, increased soil temperatures after timber removal	High	Soil displacement and gouging of skid trails, high visual impact, reduced timber production potential
82	High	Soil displacement, exposure of light colored pumice soil of low fertility, visual impact	High	Soil displacement and gouging of skid trails, exposure of light colored soils of low fertility, high visual impact
83	High	Soil displacement, exposure of light colored pumice soil of low fertility, visual impact	High	Soil displacement and gouging of skid trails, exposure of light colored soils of low fertility, high visual impact
84	High	Soil displacement, exposure of light colored pumice soil of low fertility, visual impact	High	Soil displacement and gouging of skid trails, exposure of light colored soils of low fertility, high visual impact
85	Moderate to low	Soil displacement, exposure of light colored pumice soils of low fertility, some compaction where activity is concentrated	Moderate to high	Soil displacement and gouging of skid trails
86	High to moderate	Soil displacement	High	Soil displacement and gouging of skid trails
87	High to moderate	Soil displacement	High	Soil displacement and gouging of skid trails
88	High	Soil displacement, removal of thin soil, exposure of some light colored bedrock materials, erosion on skid trails, impacts from roads	High	Soil displacement and gouging of skid trails, erosion of skid trails, impacts from roads, possible stability problems
89	High	Soil displacement, removal of thin soil, exposure of some light colored bedrock materials, erosion on skid trails, impacts from roads	High	Soil displacement and gouging of skid trails, erosion of skid trails, impacts from roads, possible stability problems
90	Moderate to low	Soil displacement, erosion, compaction	Moderate	Soil displacement and gouging on skid trails
91	N/A	N/A	N/A	N/A
92	Moderate	Soil displacement; regeneration difficulties due to microclimatic changes after harvest; compaction where activity is heavy	High	Soil displacement and gouging
93	Moderate to low	Soil displacement	Moderate	Soil displacement and gouging of skid trails
94	Moderate to low	Soil displacement	Moderate	Soil displacement and gouging on skid trails
95	Moderate	Soil displacement	High to moderate	Soil displacement and gouging on skid trails
96	Moderate to low	Soil displacement, exposure of light colored pumice soils of low fertility	Moderate	Soil displacement and gouging on skid trails
97	Moderate	Soil displacement, some compaction where activity is heavy	Moderate to high	Soil displacement and gouging on skid trails
98	Moderate	Soil displacement, some compaction where activity is heavy	Moderate to high	Soil displacement and gouging on skid trails
1A	N/A	N/A	N/A	N/A
2A	Moderate to low	Soil displacement, exposure of coarse textured pumice soil of low fertility	Moderate	Soil displacement and gouging of skid trails
2B	Moderate to low	Soil displacement, exposure of coarse textured pumice soil of low fertility	Moderate	Soil displacement and gouging of skid trails
4A	Moderate to low	Soil displacement, erosion along roads	Moderate	Soil displacement and gouging of skid trails
4C	N/A	N/A	N/A	N/A
5A	High	Soil displacement, exposure of light colored pumice soils of low fertility, high visual impact, erosion on skid trails	High	Soil displacement and gouging of skid trails, erosion, high visual impact
6A	Moderate to low	Soil displacement, compaction of heavy activity sites, some erosion on roads and skid trails	Moderate to low	Soil displacement and gouging of skid trails
6B	Moderate to low	Soil displacement, compaction of heavy activity sites, some erosion on roads and skid trails	Moderate	Soil displacement and gouging of skid trails
6C	N/A	N/A	N/A	N/A
6E	Moderate to high	Soil displacement, erosion on skid trails and roads	Moderate	Soil displacement and gouging of skid trails, erosion of trails and roads
6G	Moderate	Soil displacement, compaction, increased frost hazard after harvest, wind erosion	Moderate	Soil displacement and gouging of skid trails
6H	Moderate to low	Soil displacement, some compaction on heavy use areas	Moderate	Soil displacement and gouging of skid trails
6J	Moderate to low	Soil displacement, compaction on heavy use areas	Moderate	Soil displacement and gouging of skid trails
7A	Low to moderate	Soil displacement	Low to moderate	Soil displacement
7B	Moderate	Soil displacement, erosion along roads, exposure of light colored pumice soil of low fertility	Moderate	Soil displacement and gouging of skid trails, exposure of light colored pumice soil of low fertility

1/ Impacts from tractor logging are rated for skidding with one end of the log being suspended and the harvest being complete or nearly complete. This interpretation was made by considering a machine such as a d-6 crawler Caterpillar as a standard. Other machines may have more or less impact depending on size, ground pressure exerted, and other features.

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SOIL & WATER IMPACTS FROM VARIOUS TIMBER HARVEST METHODS

Land-type No.	Impact from Cable (partial suspension)	Type of Damage	Impact from Cable (full suspension)	Type of Damage	Impact from Aerial Logging	Type of Damage
78	Moderate	Soil displacement and erosion on skid trails	Low	2/	Low	2/
79	Moderate	Soil displacement and erosion on skid trails	Low	2/	Low	2/
80	Low	Soil displacement	Low	2/	Low	2/
81	Moderate	Soil displacement and some gouging on skid trails, high surface temperatures with removal of timber	Low	Increased surface temperatures	Low	2/
82	Moderate	Soil displacement on skid trails, impacts from roading	Low to moderate	Impacts from roading	Low	2/
83	Moderate	Soil displacement on skid trails, impacts from roading	Low to moderate	Impacts from roading	Low	2/
84	Moderate	Soil displacement on skid trails, impacts from roads	Low to moderate	Impacts from roads	Low	2/
85	Moderate to low	Soil displacement	Low	2/	Low	2/
86	Moderate to low	Soil displacement	Low	2/	Low	2/
87	Moderate to low	Soil displacement	Low	2/	Low	2/
88	Moderate	Soil displacement and erosion on skid trails, erosion and some failures along roads	Moderate to low	Erosion and some failures along roads	Low	2/
89	Moderate to high	Soil displacement and erosion on skid trails, erosion and some failures along roads	Moderate	Removal of timber will decrease soil stability. Erosion and failures along roads	Low to moderate	Removal of trees may relate to decreased soil stability and increases in erosion on these steep slopes
90	Low	Some displacement, compaction, and erosion of skid trails	Low	2/	Low	2/
91	N/A	N/A	N/A	N/A	N/A	N/A
92	Moderate to low	Soil displacement and microclimatic changes after harvest	Low	2/	Low	2/
93	Low	Some soil displacement in skid trails	Low	2/	Low	2/
94	Low	2/	Low	2/	Low	2/
95	Moderate	Soil displacement on skid trails	Low	2/	Low	2/
96	Low	2/	Low	2/	Low	2/
97	Low	Some displacement on skid trails	Low	2/	Low	2/
98	Low	Some soil displacement on skid trails	Low	2/	Low	2/
1A	N/A	N/A	N/A	N/A	N/A	N/A
2A	Low	2/	Low	2/	Low	2/
2B	Low	2/	Low	2/	Low	2/
4A	Low to moderate	Soil displacement, erosion along roads	Low	2/	Low	2/
4C	N/A	N/A	N/A	N/A	N/A	N/A
5A	Moderate to high	Primary impacts are from roads, some soil displacement in skid trails	Moderate to low	Impacts from roads	Low	2/
6A	Low	2/	Low	2/	Low	2/
6B	Low	2/	Low	2/	Low	2/
6C	N/A	N/A	N/A	N/A	N/A	N/A
6E	Low	Soil displacement; impact from roads	Low	Impacts related to roads	Low	2/
6G	Low	2/	Low	2/	Low	2/
6H	Low	Minor soil displacement	Low	2/	Low	2/
6J	Low	2/	Low	2/	Low	2/
7A	Low	2/	Low	2/	Low	2/
7B	Low	2/	Low	2/	Low	2/

2/ Impacts will be similar to, or less significant, than described for systems to the left in the table. Some soil displacement, microclimatic changes, and impacts related to roads and landings can be expected.

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PART 1
INTERPRETATIONS FOR TIMBER MANAGEMENT
SOIL & WATER IMPACTS FROM VARIOUS TIMBER HARVEST METHODS

Land-type No.	Impact from Tractor Logging 1/	Type of Damage	Impact from Cable (no suspension)	Type of Damage
7C	Low to moderate	Soil displacement	Moderate	Soil displacement and gouging of skid trails
7E	Low to moderate	Soil displacement, erosion along skid trails and roads	Moderate	Soil displacement and gouging of skid trails
7F	Moderate to low	Soil displacement, erosion along roads and skid trails	Moderate	Soil displacement, gouging, and erosion on skid trails
7G	Moderate to high	Soil displacement; exposure of light colored, coarse textured, pumice soils of low fertility	Moderate to high	Soil displacement and gouging of skid trails
7H	Moderate to high	Soil displacement, erosion along skid trails and roads, some compaction	High	Soil displacement, gouging, and erosion on skid trails
7J	Moderate	Soil displacement, microclimatic changes after timber harvest, increased frost problems, wind erosion	Moderate	Soil displacement and gouging of skid trails
7K	Moderate to high	Soil displacement, wind and water erosion on exposed soil, increased surface temperatures after harvest	Moderate	Soil displacement and gouging of skid trails, erosion
7Z	N/A	N/A	N/A	N/A
8A	High	Soil displacement, exposure of light colored pumice soils, visual impact, some erosion of exposed soils, impacts from roads	High	Soil displacement and gouging of skid trails, visual impact
8B	Moderate	Soil displacement, compaction on high activity sites	Moderate	Soil displacement and gouging of skid trails; exposure of light colored, coarse textured pumice soils
8C	High	Soil displacement, erosion, visual impacts	High	Soil displacement and gouging of skid trails, visual impacts, erosion
8E	High	Severe erosion, impacts from roads	High	Gouging of skid trails, impacts from roads, erosion
8F	High	Soil displacement, exposure of light colored pumice of low fertility, visual impact	High	Soil displacement and gouging, exposure of light colored pumice of low fertility, visual impact
8T	High	Soil displacement, removal of thin soil over light colored bedrock on some sites, high visual impact	High	Soil displacement and gouging of skid trails, erosion, visual impact, removal of thin soils over bedrock on some sites
9A	High	Soil displacement, exposure of light colored pumice soils of low fertility, high visual impact	High	Soil displacement and gouging of skid trails, high visual impact
9B	High	Soil displacement, exposure of light colored pumice soils of low fertility, high visual impact	High	Soil displacement and gouging of skid trails, high visual impact
9C	High	Soil displacement, exposure of light colored pumice soils of low fertility; high visual impact; increased surface temperatures; and erosion, especially by wind	High	Soil displacement and gouging of skid trails, high visual impact
9F	Moderate	Soil displacement and exposure of light pumice soils to erosion, especially by wind; some compaction problems on heavy use areas	Moderate	Soil displacement and gouging of skid trails
9G	Moderate	Soil displacement and exposure of light pumice soils to erosion, especially by wind; some compaction problems on heavy use areas	Moderate	Soil displacement and gouging of skid trails
9J	High to moderate	Soil displacement, exposure of light colored pumice soils of low fertility, high visual impact	High	Soil displacement and gouging of skid trails, high visual impact due to exposure of light colored pumice soils
9K	Moderate to low	Soil displacement, exposure of light colored pumice soil of low fertility, increased frost hazard after harvest	Moderate to low	Soil displacement and gouging of skid trails
9L	Moderate to low	Soil displacement and exposure of light colored pumice soils, wind erosion on exposed soils, compaction where heavy equipment activity is concentrated	Moderate	Soil displacement and gouging of skid trails
9M	Moderate	Soil displacement and exposure of light colored pumice soils, wind erosion on exposed soils, compaction where heavy equipment activity is concentrated	Moderate	Soil displacement and gouging of skid trails
9N	High	Soil displacement and exposure of light colored pumice soils, sheet erosion of exposed soils, high visual impact	High	Soil displacement and gouging of skid trails, high visual impact due to exposure of light colored pumice soils
9P	High	Soil displacement, exposure of light colored pumice soils, sheet erosion and ravelling, high visual impact	High	Soil displacement and gouging of skid trails, erosion and ravelling in skid trails, impacts related to roads
9R	High	Soil displacement, exposure of light colored pumice soils, sheet erosion and ravelling, high visual impact	High	Soil displacement and gouging of skid trails, erosion and ravelling in skid trails, impacts related to roads
9S	High	Soil displacement, exposure of light colored pumice soils, sheet erosion and ravelling, high visual impact	High	Soil displacement and gouging of skid trails, erosion and ravelling in skid trails, impacts related to roads
9T	High	Soil displacement and exposure of light colored pumice soils, high visual impact, erosion and ravelling	High	Soil displacement and gouging of skid trails, visual impact, erosion and ravelling

1/ Impacts from tractor logging are rated for skidding with one end of the log being suspended and the harvest being complete or nearly complete. This interpretation was made by considering a machine such as a D-6 crawler Caterpillar as a standard. Other machines may have more or less impact depending on size, ground pressure exerted, and other features.

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

PART 2
INTERPRETATIONS FOR TIMBER MANAGEMENT
SOIL & WATER IMPACTS FROM VARIOUS TIMBER HARVEST METHODS

Land-type No.	Impact from Cable (partial suspension)	Type of Damage	Impact from Cable (full suspension)	Type of Damage	Impact from Aerial Logging	Type of Damage
7C	Low	Soil displacement on skid trails	Low	2/	Low	2/
7E	Low	2/	Low	2/	Low	2/
7F	Low	2/	Low	2/	Low	2/
7G	Low to moderate	Impacts from roads, some soil displacement	Low	Visual impacts and ravelling along roads	Low	2/
7H	Low	Soil displacement and some erosion on skid trails	Low	2/	Low	2/
7J	Low	2/	Low	2/	Low	2/
7K	Moderate to low	Soil displacement and erosion, impacts from roads	Low	Impacts related to roads	Low	2/
7Z	N/A	N/A	N/A	N/A	N/A	N/A
8A	Moderate to low	Soil displacement, impacts from roads	Low	Impacts related to roads	Low	2/
8B	Low	Some soil displacement	Low	2/	Low	2/
8C	Moderate	Soil displacement and some erosion, increased surface temperatures with removal of timber	Low	Reduced soil protection by timber harvest	Low	2/
8E	High	Increased erosion, impacts from roads	Moderate	Increased erosion, impacts from roads	Moderate	Increased erosion due to removal of timber
8F	Moderate	Soil displacement, removal of timber will increase wind erosion and re-generation will be difficult, visual impacts	Moderate	Impacts from roads, surface exposure from removal of timber, visual impacts	Low to moderate	Surface exposure to wind and temperature extremes, difficult to regenerate
8T	Moderate to high	Impacts from roading, soil displacement, removal of thin soil in some spots	Moderate	Impacts from roads, changes in micro-climate after timber removal	Low to moderate	Changes in microclimatic conditions after timber harvest
9A	Moderate to low	Some soil displacement and removal of surface organic matter, visual impacts from roads	Low	Impacts related to roads	Low	2/
9B	Moderate to low	Some soil displacement and removal of surface organic matter, visual impacts from roads	Low	Impacts related to roads	Low	2/
9C	Moderate to low	Soil displacement	Low to moderate	Impacts are primarily related to roads, especially visual	Low	2/
9E	Low	2/	Low	2/	Low	2/
9G	Low	2/	Low	2/	Low	2/
9J	Moderate to low	Some soil displacement and impacts related to roads	Low	2/	Low	2/
9K	Low	2/	Low	2/	Low	2/
9L	Low	2/	Low	2/	Low	2/
9M	Low	2/	Low	2/	Low	2/
9N	Moderate	Some soil displacement and exposure of light colored pumice soils, impacts related to roads	Low	Impacts related to roads, primarily visual	Low	2/
9P	Moderate	Soil displacement, decreased soil stability from timber removal, impacts from roads	Moderate to low	Decreased soil stability from timber removal, impacts from roads	Low to moderate	Decreased soil stability from timber removal
9R	Moderate	Soil displacement, impacts from roads, increased surface temperatures	Low to moderate	Decreased soil stability from timber removal, impacts from roads	Low to moderate	Decreased soil stability from timber removal
9S	Moderate	Soil displacement, impacts from roads, increased surface temperatures	Low to moderate	Decreased soil stability from timber removal, impacts from roads	Low to moderate	Decreased soil stability from timber removal
9T	Low to moderate	Soil displacement in skid trails. Impacts from roads	Low	2/	Low	2/

2/ Impacts will be similar to, or less significant, than described for systems to the left in the table. Some soil displacement, microclimatic changes, and impacts related to roads and landings can be expected.

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

PART 1
INTERPRETATIONS FOR TIMBER MANAGEMENT
SOIL & WATER IMPACTS FROM VARIOUS TIMBER HARVEST METHODS

Land-type No.	Impact from Tractor Logging 1/	Type of Damage	Impact from Cable (no suspension)	Type of Damage
9U	Moderate to low	Soil displacement, increased frost hazard for regeneration, exposure of coarse pumice soil of low fertility	Moderate	Gouging of skid trails and exposure of coarse pumice soils of low fertility
9V	Low to moderate	Soil displacement	Low to moderate	Soil displacement and gouging
9W	Moderate to low	Soil displacement, exposure of light colored pumice soils of low fertility, increased frost hazard after harvest	Moderate	Soil displacement and gouging of skid trails
9X	High to moderate	Soil displacement, exposure of light colored pumice soils of low fertility, visual impact	High	Soil displacement and gouging of skid trails, visual impact
9Y	Moderate	Soil displacement, some erosion	High to moderate	Soil displacement and gouging of skid trails
9Z	High	Soil displacement, exposure of light colored pumice soils, visual impact, increased sheet erosion	High	Soil displacement and gouging of skid trails, high visual impact, erosion and ravelling in skid trails

1/ Impacts from tractor logging are rated for skidding with one end of the log being suspended and the harvest being complete or nearly complete. This interpretation was made by considering a machine such as a D-6 crawler Caterpillar as a standard. Other machines may have more or less impact depending on size, ground pressure exerted, and other features.

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

PART 2
INTERPRETATIONS FOR TIMBER MANAGEMENT
SOIL & WATER IMPACTS FROM VARIOUS TIMBER HARVEST METHODS

Land-type No.	Impact from Cable (partial suspension)	Type of Damage	Impact from Cable (full suspension)	Type of Damage	Impact from Aerial Logging	Type of Damage
9U	Low	Increase frost hazard after timber harvest	Low	2	Low	2/
9V	Low	2/	Low	2/	Low	2/
9W	Low	2/	Low	2/	Low	2/
9X	Low to moderate	Some soil displacement	Low	2/	Low	2/
9Y	Low to moderate	Soil displacement, impacts related to roads	Low	Impacts related to roads	Low	2/
9Z	Low to moderate	Some soil displacement and impacts related to roads	Low	Impacts related to roads	Low	2/

2/ Impacts will be similar to, or less significant, than described for systems to the left in the table. Some soil displacement, microclimatic changes, and impacts related to roads and landings can be expected.

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

INTERPRETATIONS FOR ENGINEERING - PART 1

Land-type No.	Unified Classification	Suitability for Use as Topsoil Source	Suitability of Soil as Sand and/or Gravel Source	Suitability of Soil as a Possible Clay Source	Suitability of Bedrock for Road Rock	Limitations of Bedrock for Road Rock	Consideration for Road Location and Construction*	Method of Excavation	Cutbank & Ditch Erosion Potential	Susceptibility to Cutbank Sloughing and Ravelling
1	N/A	Unsuited	Unsuited	Unsuited	Good	Difficult to crush	Rocky, uneven land	Blasting and blading	Low	Moderate (rock fall)
2	Not rated	Unsuited	Unsuited	Unsuited	Variable	Hearness to streams limits quarrying	Avoid running roads parallel to streams in this unit. Provide adequate drainage facilities	Blading, some blasting	High	Low
3	N/A	Unsuited	Generally unsuited, but with some cinder deposits	Unsuited	Variable	Very steep slopes, some soft materials	Steep rocky slopes at high elevations	Blasting and blading	Low	High
4	Not rated	Unsuited	Unsuited	Unsuited	Poor to good	Some soft materials that break down readily	Climatic limitations due to high elevation.	Blading	High	N/A
5	Not rated	Suited on some locations	Generally unsuited	Suited on a few locations	N/A	N/A	Wet areas, some organic soils	Blading	N/A	N/A
6	Not rated	Unsuited	Unsuited	Unsuited	Good to fair	Some soft materials that break down readily	Steep, rocky slopes; sidecast waste damage potential to downslope soils	Blading, ripping, and blasting	High	High to moderate
7	SP-GW	Unsuited	May be suited on some locations	Unsuited	Good	Generally good where not underlain by gravels	N/A	Blading	N/A	N/A
8	Not rated due to variability	Unsuited	Suited on some sites	Unsuited	N/A	Watertable, depth of overburden	Provide adequate drainage and maintain a suitable buffer strip between roads and streams	Blading	N/A	N/A
9	GW-GP	Unsuited	Suited	Unsuited	Fair (cinders)	Tends to break down under logging traffic	Cutbanks will ravel; potential for high visual impacts	Blading	Low	High
10	Not rated	Unsuited	Unsuited	Unsuited	Unsuited to good	Some soft pyroclastic rocks	Sidecast material could cause water quality problems	Blading, ripping, and blasting	Low to moderate	High to moderate
11	N/A	Unsuited	Unsuited	Unsuited	Good	Difficult to blast and brush	Very stony land	Blading and blasting	Low	N/A
12	SMd, SP, GM	Unsuited	Unsuited	Unsuited	Good	May be difficult to quarry	Moderate to steep, complex slopes; snowed in much of the year	Blading and blasting	Moderate	Low to moderate
13	Not rated	Unsuited	Unsuited	Unsuited	Good	Steep slopes at high elevations	It is unlikely that roads would be constructed in this landtype; snow slide hazard	Blasting and blading	Moderate to high	Moderate
14	Not rated	Unsuited	Unsuited	Unsuited	Good	Difficult to quarry due to large size of blocks	Steep, stony slopes	Blasting and blading	Moderate to high	Moderate
15	SMd, SP, SW, GP, GM	Unsuited	Unsuited	Unsuited	Generally good	Depth to bedrock is greater than 12 feet in some areas	No special considerations	Blading	Low	N/A
16	SMd, SP, SW, GM	Unsuited	Unsuited	Unsuited	N/A	Depth of overburden	Avoid wet spots in this unit	Blading and ripping	Moderate	Moderate
17	SMd, GM	Unsuited	Unsuited	Unsuited	N/A	Use restricted by depth to bedrock	No special considerations	Blading and ripping	Moderate	N/A
18	SMd, SP, GM	Unsuited	Unsuited	Unsuited	Poor to good	Some soft materials are included	Most of this unit lies in Wilderness areas, avalanche tracks need special consideration	Blading, ripping, and blasting	High to moderate	Moderate to high
19	SMd, SP, GM	Unsuited	Unsuited	Unsuited	N/A	Depth of overburden	No special considerations	Blading and ripping	Moderate	N/A

* Dustiness is an item to consider on all roads except on rough, rocky land and wet areas. Surfacing or dust abatement materials should be applied when dust conflicts with other values.

INTERPRETATIONS FOR ENGINEERING - PART 2

Land-type No.	Probability of Cutbank Failures	Suggestions for Cutbank Stability Problems	Failure Potential on Road Waste and Fills	Erosion Potential on Road Waste and Fills	Suitability of Road Waste & Fill Slopes to Seeding	Limitations to Road Waste & Fill Slope Seeding	Suggestions for Road Waste & Fill Slope Seeding	Suitability of Cutbanks to Seeding	Limitations to Cutbank Seeding	Suggestions for Cutbank Seeding
1	I	N/A	Low	Low	Unsuited	Stoniness	N/A	Unsuited	Stoniness	N/A
2	I-II	N/A	Low to moderate	Moderate	Low to moderate	Coarse textured soils, high elevations, some steep slope	Use high elevation native species 1/	Low	Coarse soils, high elevation	Use high elevation native species 1/
3	III-V	Retaining walls	High	Low	Unsuited	Stoniness, lack of soil, severe climate	N/A	Unsuited	Stoniness, lack of soil	N/A
4	N/A	N/A	Low	Moderate	Low	Low fertility, coarse soils, frost heaving, cold climate	Use native species suited to high elevations, fertilize and mulch	Low	Low fertility, coarse soils, cold climate	Use native species suited to high elevations, fertilize and mulch
5	N/A	N/A	N/A	N/A	High	N/A	N/A	N/A	N/A	N/A
6	II-III	Retaining walls may have local application	Moderate	High	Low	High elevation, stony soils, steep slopes, exposed aspects	Avoid seeding rocky areas	Low	Rocky slopes, high elevation	Avoid seeding rocky areas
7	N/A	N/A	N/A	Low	Low	Frost pockets, coarse soils of low fertility	2/	N/A	N/A	N/A
8	N/A	N/A	N/A	Moderate to high	Fair to good	Local droughtiness	1/	N/A	N/A	N/A
9	III	Retaining walls	Low to moderate	Low	Unsuited	Lack of soil, coarse cinders, droughtiness	2/	Low to unsuited	Lack of soil, coarse cinders	Probability of success is so low that it is not feasible to seed these slopes unless topsoil is added
10	II-III	Retaining walls may have application locally	Moderate to low	Moderate	Poor to fair	South aspects are droughty, coarse textured soils of low fertility, soil ravelling	1/	Poor	Coarse soils, low fertility, ravelling, some droughty sites	Seed only where sufficient soil material is available
11	N/A	N/A	N/A	N/A	Unsuited	Lack of soil, lava flows	N/A	Unsuited	Lack of soil, lava flows	N/A
12	II-III	No special suggestions	Moderate to low	Moderate	Poor	Coarse soils, cold climate	1/	Poor	Coarse soils, low fertility, cold climate	1/
13	II	Retaining walls may be needed locally to prevent rock fall into the road	Moderate	Moderate	Poor	Coarse, stony soils at high elevations, harsh climate and low fertility	2/	Poor	Rocky slopes, high elevation	2/
14	I-II	No special suggestions	Low	Moderate to high	Poor to fair	Coarse soils, droughty	1/	Poor to fair	Coarse textured soils, droughty, ravelling	1/
15	N/A	N/A	N/A	Low	Poor	Frost pockets, climatic extremes and low soil fertility	2/	N/A	N/A	N/A
16	I-II	N/A	Low	Moderate	Poor to fair	Coarse textured soils of low fertility	1/, some 2/	Poor to fair	Coarse soils of low fertility, ravelling	1/, 2/
17	N/A	N/A	Low	Moderate	Fair	Coarse textured soils of low fertility	1/	Fair	Coarse textured soils of low fertility	1/
18	II-III	Retaining walls may be needed locally to prevent rock fall.	Moderate	Moderate	Poor	Steep slopes, high elevations, low fertility, stoniness	2/	Poor	Steep, rocky slopes; high elevation	2/
19	N/A	N/A	Low	Moderate	Fair	Coarse textured soils of low fertility	1/	Poor to fair	Coarse textured soils of low fertility, droughtiness and some ravelling	1/

1/ Prepare seed bed, fertilize, seed, and mulch, using species adapted to the climatic zone and moisture regime of the landtype. Periodic watering will be needed in many cases for grass establishment. Native shrubs should also be considered.

2/ Seeding success is questionable. Each site should be evaluated on a project basis for seeding recommendations. Native shrubs may be successful on some of these sites not suited for grasses.

INTERPRETATIONS FOR ENGINEERING - PART 1

Land-type No.	Unified Classification	Suitability for Use as Topsoil Source	Suitability of Soil as Sand and/or Gravel Source	Suitability of Soil as a Possible Clay Source	Suitability of Bedrock for Road Rock	Limitations of Bedrock for Road Rock	Consideration for Road Location and Construction*	Methods of Excavation	Cutbank & Ditch Erosion Potential	Susceptibility to Cutbank Sloughing and Ravelling
20	Not rated	Unsuited	Unsuited	Unsuited	Unsuited to good	Depth of overburden limits use over much of the area, some soft materials	Special measures must be taken to protect water quality	Blading, ripping, and blasting	Moderate	Low to moderate
21	SMd, SP, CH	Unsuited	Unsuited	Unsuited	N/A	Depth of overburden	Road cuts and adjacent material may have high visual impacts	Blading and ripping	Moderate	Moderate
22	SMd, SP, CH	Unsuited	Unsuited	Unsuited	N/A	Depth of overburden	Subsurface drainage over compact till is common on this landtype	Blading and ripping	Moderate	Moderate
23	SMd, SP, CH	Unsuited	Unsuited	Unsuited	Some good	Depth of overburden	Steep slopes, subsurface drainage on compact till	Blading, ripping, and some blasting	High	Moderate
24	SMd, CH	Unsuited	Unsuited	Unsuited	N/A	Depth of overburden	Avoid unstable spots as much as possible, provide adequate drainage of cutbanks	Blading and ripping	Moderate	Moderate
25	SMd, SP, SM	Unsuited	Unsuited	Unsuited	N/A	Depth of overburden	Some wet spots may be present as well as subsurface flow over compact glacial till	Blading and ripping	Low to moderate	Moderate
26	SMd, CH	Unsuited	Unsuited	Unsuited	N/A	Depth of overburden	Rapid runoff may occur on this landtype	Blading and ripping	Low to moderate	Low to moderate
27	SMd, CH	Unsuited	Unsuited	Unsuited	N/A	Depth of overburden	Subsurface flow over compact till occurs on this landtype	Blading and ripping	Moderate	Low to moderate
28	SMd, SP, CH	Unsuited	Unsuited	Unsuited	N/A	Depth of overburden	Moderate to steep, complex slopes; subsurface drainage	Blading and ripping	Moderate to high	Low to moderate
29	SMd, SP, CH	Unsuited	Unsuited	Unsuited	N/A	Depth of overburden	No special consideration	Blading and ripping	Moderate	N/A
30	SMd, GM, CH	Unsuited	Unsuited	Unsuited	N/A	Depth of overburden, watertable	Proper drainage is very important	Blading	High to moderate	N/A
31	SMd, SP	Unsuited	Unsuited	Unsuited	N/A (Some locally good material)	Depth of overburden	Drainages and wet spots are common along these steep slopes	Blading and ripping	Moderate to high	High
32	SMd	Unsuited	May have some suitable deposits	Unsuited	N/A	Depth of overburden	No special considerations	Blading	Moderate	Low to moderate
33	SM, SP, GP	Unsuited	Suited	Unsuited	N/A	Depth of overburden	Cindery soils	Blading	Low to moderate	High
34	SMd, SP, GP	Unsuited	Suited	Unsuited	N/A	Depth of overburden	Cindery soils on steep slopes	Blading	Low to moderate	High
35	SMd	Unsuited	Suited	Unsuited	N/A	Depth of overburden	Steep slopes	Blading	Moderate	Moderate
36	SMd, GP, GW	Unsuited	Suited	Unsuited	N/A	Depth of overburden	No special considerations	Blading	Low	N/A
37	SMd, GP, GW	Unsuited	Suited	Unsuited	N/A	Depth of overburden	No special considerations	Blading	Low to moderate	N/A
38	SMd, SW	Unsuited	Suited	Unsuited	N/A	Depth of overburden	Steep slopes	Blading	Moderate to high	Moderate
39	SMd, ML, SP, MH	Suited	Unsuited	Unsuited (some thin bands of clay present)	N/A	Depth of overburden	Wet spots may be included in these areas	Blading	Low to moderate	N/A
40	SMd, SW, ML, MH	Suited	Unsuited to suited	Unsuited to suited	N/A	Depth of overburden	Proper drainage is a major consideration	Blading	High to moderate	N/A
41	SMd, SW	Unsuited	Suited	Unsuited	N/A	Depth of overburden	No special considerations	Blading	Moderate to low	Moderate

* Dustiness is an item to consider on all roads except on rough, rocky land and wet areas. Surfacing or dust abatement materials should be applied when dust conflicts with other values.

INTERPRETATIONS FOR ENGINEERING - PART 2

Land-type No.	Probability of Cutbank Failures	Suggestions for Cutbank Stability Problems	Failure Potential on Road Waste and Fills	Erosion Potential on Road Waste and Fills	Suitability of Road Waste & Fill Slopes to Seeding	Limitations to Road Waste & Fill Slope Seeding	Suggestions for Road Waste & Fill Slope Seeding	Suitability of Cutbanks to Seeding	Limitations to Cutbank Seeding	Suggestions for Cutbank Seeding
20	II	N/A	Low to moderate	Moderate	Fair	Low fertility, frost heaving	1/	Poor to fair	Low fertility, steepness, climatic limitations	1/
21	II-III	May need local retaining walls	Moderate to low	Moderate	Fair	Coarse textured soils of low fertility, droughtiness, ravelling	1/	Poor to fair	Droughtiness, low fertility	1/
22	II-III	Provide adequate drainage along cutbanks	Low to moderate	Moderate	Fair	Coarse textured soils	1/	Fair to poor	Coarse soils, ravelling, some compact material	1/
23	II	Provide adequate drainage along cutbanks	Low to moderate	High	Poor to fair	Sandy soils, low fertility	1/	Poor	Sandy soils, steep slopes	1/
24	III-IV	Provide adequate drainage of cutbanks, retaining walls may have local application	Moderate	Moderate	Fair to good	Coarse textured soils of fairly low fertility	1/	Fair	Coarse soils, some compact material	1/
25	V-II	No special suggestions	Low	Moderate	Poor to fair	Coarse textured soils of low fertility	1/	Poor to fair	Coarse textured soils, low fertility, some compact materials	1/
26	I-II	Some retaining structures may be needed; provide adequate drainage	Low	Moderate	Fair	Coarse textured soils	1/	Fair	Some stony, compact material; low fertility	1/
27	I-II	Provide adequate drainage	Low to moderate	Moderate	Fair to good	Low fertility, droughty on some sites	1/	Fair	Some stony, compact materials; droughty on some sites	1/
28	Low	Provide adequate drainage	Low	Moderate to high	Good to fair	Coarse soils, some drought problems and erosion	1/	Fair to good	Coarse soils, ravelling, some compact material	1/
29	N/A	No special suggestions	Low	Moderate to low	Good to fair	Coarse soils, some drought problems	1/	Fair to good	Coarse soils, ravelling, droughtiness	1/
30	N/A	N/A	N/A	High	Good	Some erosion, low fertility	1/	N/A	N/A	N/A
31	II	Provide adequate drainage	Low to moderate	Moderate	Poor	Coarse textured, pumice soils at high elevations	2/	Poor	Coarse textured soils, low fertility, high elevation, ravelling	2/
32	I	No special suggestions	Low	Moderate	Fair	Coarse textured soils, droughtiness, low fertility	1/	Fair	Coarse textured soils, low fertility, droughtiness	1/
33	I	Lay cutbanks fairly flat	Low	Low to moderate	Poor	Coarse textured, cindery soils	2/	Poor	Coarse textured, cindery soils	2/
34	I-II	No special suggestions	Low	Low	Poor	Coarse, cindery soils	2/	Poor	Coarse, cindery soils; ravelling	2/
35	I	No special suggestions	Low	Moderate	Fair	Coarse soils, droughtiness	1/	Fair to poor	Coarse soils, ravelling, droughtiness	1/
36	N/A	N/A	N/A	Low	Fair	Droughtiness	1/	Fair	Droughtiness	1/
37	N/A	N/A	Low	Low	Fair to good	Droughtiness, coarse soils	1/	Fair to good	Coarse soils, droughtiness	1/
38	I	Lay cutbanks back as flat as practical to reduce ravelling	Low	Moderate to high	Fair	Coarse soils, steep slopes	1/	Fair	Coarse soils, steep slopes, ravelling	1/
39	N/A	N/A	Low	Low to moderate	Fair to good	Droughtiness	1/	Fair to good	Droughtiness, low fertility	1/
40	N/A	N/A	N/A	High to moderate	Good	Periodic flooding, some coarse soils	1/	Good	N/A	1/
41	I	N/A	Low	Moderate	Fair	Coarse soils, droughtiness	1/	Fair	Coarse soils, droughtiness	1/

1/ Prepare seed bed, fertilize, seed, and mulch, using species adapted to the climatic zone and moisture regime of the landtype. Periodic watering will be needed in many cases for grass establishment. Native shrubs should also be considered.

2/ Seeding success is questionable. Each site should be evaluated on a project basis for seeding recommendations. Native shrubs may be successful on some of these sites not suited for grasses.

INTERPRETATIONS FOR ENGINEERING - PART 1

Land-type No.	Unified Classification	Suitability for Use as Topsoil Source	Suitability of Soil as Sand and/or Gravel Source	Suitability of Soil as a Possible Clay Source	Suitability of Bedrock for Road Rock	Limitations of Bedrock for Road Rock	Consideration for Road Location and Construction*	Method of Excavation	Cutbank & Ditch Erosion Potential	Susceptibility to Cutbank Sloughing and Ravelling
42	SMd, SW	Unsuited	Suited	Unsuited	N/A	Depth of overburden	No special considerations	Blading	Moderate	Moderate
43	SMd, SP, SW	Unsuited	Suited (Limited by high watertable)	Unsuited	N/A	Depth of overburden, watertable	Orient roads perpendicular to drainages and provide adequate drainage facilities	Blading	High	N/A
44	SMd, SP, SW, GW	Unsuited	Suited	Unsuited	N/A	Depth of overburden, watertable	The watertable is likely to appear in ditches	Blading	High to moderate	N/A
45	SMd, SP, SW, GW	Unsuited	Suited	Unsuited	N/A	Depth of overburden	No special considerations	Blading	Moderate	N/A
46	SMd, SW, GW, GM	Unsuited	Suited	Unsuited	N/A	Depth of overburden	No special considerations	Blading	Moderate	N/A
47	SMd, SW, GW, GM	Unsuited	Suited	Unsuited	N/A	Depth of overburden	No special considerations	Blading	Moderate	N/A
48	SMd, SP, SW	Some sites are suited	Suited	Unsuited	N/A	Depth of overburden	No special considerations	Blading	Moderate	N/A
49	SMd, SW, SP	Unsuited	Suited	Unsuited	N/A (some spots may be good)	Depth of overburden	Steep slopes, hard rock may occur near the surface on some sites	Blading	Moderate	Moderate
50	SMd, ML, SC	Unsuited	Unsuited	Unsuited	Unsuited to fair	Most of the materials are too soft for road rock	Steep slopes, thin soils, high potential for visual impacts	Blading and ripping, some blasting	High	Low to moderate
51	SMd, SC, ML	Unsuited	Unsuited	Unsuited	Unsuited to fair	Most of the materials are too soft for road rock	Steep slopes	Blading, ripping, and some blasting	High to moderate	Low to moderate
52	SMd, SC, ML	Unsuited	Unsuited	Unsuited	Unsuited to fair	Much of the bedrock is too soft for road rock material	Some steepy spots may be present, steep slopes	Blading, ripping, and some blasting	High to moderate	Moderate to low
53	SMd, SC, ML MH	Unsuited	Unsuited	Unsuited	Unsuited to good	Some materials are too soft for road rock	Clayey soils may be encountered	Blading, blasting, and ripping	Moderate	N/A
54	SMd, SC, ML	Unsuited	Unsuited	Unsuited	Unsuited to fair	Much of the material is too soft for road rock	No special considerations	Blading, ripping, and some blasting	Moderate	Low
55	SMd, ML	Unsuited	Unsuited	Unsuited	Unsuited to fair	Much of the bedrock is too soft for road rock material	No special considerations	Blading, ripping, and some blasting	Moderate	Low
56	SMd, SW, GP, GW	Unsuited	Some suitable deposits of pumice gravel	Unsuited	Unsuited	Materials are too soft for road rock	No special considerations	Blading and ripping	Moderate	Moderate to high
57	GMd, SW, SP	Unsuited	Unsuited	Unsuited	Unsuited	Bedrock is too soft for road rock materials	Steep slopes, shallow soils on upper slopes, high potential for visual impacts	Blading and ripping	Moderate to high	High to moderate
58	SMd, SP, SW	Unsuited	Unsuited	Unsuited	Unsuited	Bedrock is too soft for road rock	Steep slopes, potential for high visual impact	Blading, ripping, and some blasting	High to moderate	High
59	SMd	Unsuited	Unsuited	Unsuited	Unsuited to fair	Most of the bedrock is too soft for road rock	Steep slopes, mixed materials	Blading, ripping, and some blasting	High to moderate	High
60	SMd	May be suited locally	Unsuited	Unsuited	Good	Difficult to quarry	Some rocky sites are included	Blading and blasting	Moderate	Low
61	SMd, SC, ML	Suited at some locations, mostly unsuited	Unsuited	Unsuited	Good	N/A	Clayey soils may be encountered	Blading and blasting	Moderate	Low

* Dustiness is an item to consider on all roads except on rough, rocky land and wet areas. Surfacing or dust abatement materials should be applied when dust conflicts with other values.

INTERPRETATIONS FOR ENGINEERING - PART 2

Land-type No.	Probability of Cutbank Failures	Suggestions for Cutbank Stability Problems	Failure Potential on Road Waste and Fills	Erosion Potential on Road Waste and Fills	Suitability of Road Waste & Fill Slopes to Seeding	Limitations to Road Waste & Fill Slope Seeding	Suggestions for Road Waste & Fill Slope Seeding	Suitability of Cutbanks to Seeding	Limitations to Cutbank Seeding	Suggestions for Cutbank Seeding
42	I	N/A	Low	Moderate	Fair	Coarse soils, droughtiness	1/	Fair	Coarse soils, droughtiness	1/
43	N/A	N/A	N/A	High	Good	Coarse textured soils	Use species suited to wet areas	N/A	N/A	N/A
44	N/A	N/A	N/A	Moderate to high	Fair to good	Coarse textured soils, frost heaving	1/	Fair to good	Coarse textured soils	1/
45	N/A	N/A	N/A	Low to moderate	Fair to poor	Coarse textured soils, frost heaving, droughtiness	1/	Fair to poor	Coarse textured soils, frost heaving, droughtiness	1/
46	N/A	N/A	N/A	Moderate	Poor to fair	Coarse soils, low fertility, frost	1/	Poor to fair	Coarse soils, low fertility, frost heaving	1/
47	N/A	N/A	N/A	Moderate	Fair	Coarse soils, droughtiness	1/	Fair	Coarse soils, droughtiness	1/
48	N/A	N/A	N/A	Moderate	Fair	Droughtiness	1/	Fair	Droughtiness	1/
49	I	No special suggestions	Low	Moderate	Fair	Coarse textured soils, droughty	1/	Fair	Coarse textured soils, droughty	1/
50	II	Local retaining walls may be used	Moderate	High to moderate	Fair to good	Droughty, low fertility	1/	Fair to poor	Lack of soil materials, droughtiness, low fertility	Seed only on soil materials
51	II	Local retaining walls may be needed	Moderate to low	High to moderate	Fair to good	Droughty, low fertility	1/	Fair	Droughtiness	1/
52	II	Retaining structures may be needed locally	Moderate	High to moderate	Good to fair	Droughty summers	1/	Fair	Lack of soil material below a depth of about three feet	1/
53	N/A	N/A	N/A	Moderate	Fair	Shallow soils, droughtiness	1/	N/A	N/A	N/A
54	I-II	No special suggestions	Low	Moderate	Good to fair	Droughty summers	1/	Fair to good	Lack of soil below about 30 inches, some clayey soils, low fertility	1/
55	I-II	No special suggestions	Low	Moderate to high	Fair	Droughtiness	1/	Fair	Droughtiness	1/
56	I-II	No special suggestions	Low	Moderate	Fair to poor	Coarse textured soils, low fertility, droughtiness	1/	Poor to fair	Coarse textured soils, low fertility, droughtiness, ravelling	1/
57	I-II	No special suggestions	Low	High to moderate	Poor to fair	Coarse textured pumice soils, low fertility, droughtiness, ravelling	1/	Poor	Coarse textured pumice soils, exposure of bedrock, droughty, ravelling	2/
58	I-II	No special suggestions	Low to moderate	High	Poor to fair	Coarse textured pumice soils, low fertility, ravelling	2/	Poor	Coarse soils, exposed bedrock	1/
59	I-II	Retaining structures may be applied locally	Moderate	High	Fair	Coarse textured soils, low fertility, droughtiness	1/	Poor	Coarse soils, exposed bedrock, droughtiness	1/
60	I	N/A	Low	Moderate	Fair to good	Droughtiness	1/	Fair	Droughtiness, low fertility	1/
61	I	N/A	Low	Moderate	Fair to good	Droughtiness	1/	Fair	Droughtiness	1/

1/ Prepare seed bed, fertilize, seed, and mulch, using species adapted to the climatic zone and moisture regime of the landtype. Periodic watering will be needed in many cases for grass establishment. Native shrubs should also be considered.

2/ Seeding success is questionable. Each site should be evaluated on a project basis for seeding recommendations. Native shrubs may be successful on some of these sites not suited for grasses.

INTERPRETATIONS FOR ENGINEERING - PART 1

Land-type No.	Unified Classification	Suitability for Use as Topsoil Source	Suitability of Soil as Sand and/or Gravel Source	Suitability of Soil as a Possible Clay Source	Suitability of Bedrock for Road Rock	Limitations of Bedrock for Road Rock	Consideration for Road Location and Construction*	Method of Excavation	Cutbank & Ditch Erosion Potential	Susceptibility to Cutbank Sloughing and Ravelling
62	SMd, SC, ML	Suited at some locations, mostly unsuited	Unsuited	Unsuited	Good	N/A	Clayey soils may be encountered	Blading, ripping, and blasting	Moderate	Low
63	SMd	Unsuited	Unsuited	Unsuited	Good	N/A	No special considerations	Blading and blasting	Moderate	Moderate
64	SMd, SP, SW	Unsuited	Unsuited	Unsuited	Good	Difficult to quarry and crush	Complex slopes with some rock outcrops	Blading and blasting	Moderate	Moderate
65	SMd, SP, SW	Unsuited	Unsuited	Unsuited	Good	Difficult to quarry and crush	Complex slopes with some rock outcrops	Blading and blasting	Moderate	Moderate
66	SMd, SP, SW	Unsuited	Unsuited	Unsuited	Good	N/A	No special considerations	Blading and blasting	Moderate	Moderate
67	SMd, SW	Unsuited	Unsuited	Unsuited	Good	N/A	Depth to bedrock	Blading and blasting	Moderate	Moderate
68	SMd, SW	Unsuited	Unsuited	Unsuited	Good	N/A	Steep slopes	Blading and blasting	Moderate to high	Moderate
69	SMd, SW	Unsuited	Unsuited	Unsuited	Good	N/A	Steep slopes	Blading and blasting	Moderate to high	Moderate
70	SMd, SP, SW, GP	Unsuited	Unsuited	Unsuited	Good	Difficult to quarry and crush	No special considerations	Blading and blasting	Low to moderate	N/A
71	SMd, ML	Unsuited	Unsuited	Unsuited	Good	N/A	Long steady slopes	Blading and blasting	Moderate to high	Low
72	SMd	Unsuited	Unsuited	Unsuited	Good	Difficult to quarry and crush	Stoniness and rock outcrops are common	Blading and blasting	Moderate	N/A
73	SMd	Unsuited	Unsuited	Unsuited	Good to fair	Some soft materials may be included	No special considerations	Blading and blasting	Moderate	Low to moderate
74	SMd, SP, SW	Unsuited	Unsuited	Unsuited	Good to fair	Density is below optimum on some of the material	Very stony land	Blading and blasting	Low to moderate	Low to moderate
75	SMd, SP, SW	Unsuited	Unsuited	Unsuited	Good to fair	Density is below optimum on some of the material	Very stony land	Blading and blasting	Low to moderate	Low to moderate
76	SMd, SW, SP	Unsuited	Unsuited	Unsuited	Good to fair	Density is below optimum on some of the material	Very stony land	Blading and blasting	Moderate	Low to moderate
77	SMd, SW, SP	Unsuited	Unsuited	Unsuited	Good to fair	Density is below optimum on some of the material	Very stony land	Blading and blasting	Moderate	Low to moderate
78	SMd	Unsuited	Unsuited	Unsuited	Good	N/A	Steep slopes	Blading and blasting	Moderate	Low

* Dustiness is an item to consider on all roads except on rough, rocky land and wet areas. Surfacing or dust abatement materials should be applied when dust conflicts with other values.

INTERPRETATIONS FOR ENGINEERING - PART 2

Land-type No.	Probability of Cutbank Failures	Suggestions for Cutbank Stability Problems	Failure Potential on Road Waste and Fills	Erosion Potential on Road Waste and Fills	Suitability of Road Waste & Fill Slopes to Seeding	Limitations to Road Waste & Fill Slope Seeding	Suggestions for Road Waste & Fill Slope Seeding	Suitability of Cutbanks to Seeding	Limitations to Cutbank Seeding	Suggestions for Cutbank Seeding
62	I	N/A	Low	Moderate	Good	Droughtiness	1/	Good to fair	Some compact material of low fertility	1/
63	I	N/A	Low	Moderate	Fair	Coarse textured soils of low fertility, droughtiness	1/	Fair	Coarse textured soils of low fertility, droughtiness	1/
64	I	N/A	Low	Moderate to low	Fair	Coarse textured soils of low fertility, droughtiness	1/	Fair to poor	Coarse textured soils, low fertility, droughtiness, exposure of bedrock	1/
65	I	N/A	Low	Moderate to low	Fair	Coarse textured soils of low fertility	1/	Fair to poor	Coarse textured soils, low fertility, droughtiness, exposure of bedrock	1/
66	I	N/A	Low	Moderate to low	Fair	Coarse textured soils of low fertility	1/	Fair to poor	Coarse textured soils, low fertility, droughtiness, exposure of bedrock	1/
67	I	N/A	Low	Moderate to low	Fair	Coarse textured soils of low fertility	1/	Fair	Coarse textured soils, low fertility, droughtiness	1/
68	I	N/A	Low	Moderate	Fair	Coarse textured soils of low fertility, droughtiness	1/	Fair to poor	Coarse textured soils, low fertility, droughtiness	1/
69	I	N/A	Low	Moderate	Fair	Coarse textured soils, low fertility	1/	Fair	Coarse textured soils, low fertility	1/
70	I	N/A	N/A	Low to moderate	Poor	Coarse textured pumice soils, low fertility, frost, droughtiness	1/	Poor	Coarse textured soils of low fertility, frost heaving, droughtiness	1/
71	I	N/A	Low	Moderate to high	Fair to good	Droughtiness	1/	Fair to good	Droughtiness	1/
72	I	N/A	N/A	Moderate	Fair	Coarse textured soils, low fertility, droughtiness	1/	Fair	Coarse textured soils, low fertility, droughtiness, frost heaving	1/
73	I	N/A	Low	Moderate	Poor to fair	Coarse textured soils of low fertility, frost heaving	1/	Poor to fair	Coarse textured soils of low fertility	1/
74	I	N/A	Low	Low to moderate	Poor	Coarse textured, stony soils	2/	Poor	Coarse textured, stony soils	2/
75	I	N/A	Low	Low to moderate	Poor	Coarse textured, stony soils; droughtiness	2/	Poor	Coarse textured, stony soils; droughtiness	2/
76	I	N/A	Low	Moderate	Poor to fair	Coarse textured soils, low fertility, stony	1/, 2/	Poor	Coarse textured soils, low fertility, stoniness	2/
77	I	N/A	Low	Moderate	Poor	Coarse textured soils, low fertility, stoniness	2/	Poor	Stoniness, coarse textured soils, low fertility	2/
78	I	N/A	Low	Moderate	Fair to good	Some coarse textured soils of low fertility, droughtiness	1/	Fair	Droughtiness	1/

1/ Prepare seed bed, fertilize, seed, and mulch, using species adapted to the climatic zone and moisture regime of the landtype. Periodic watering will be needed in many cases for grass establishment. Native shrubs should also be considered.

2/ Seeding success is questionable. Each site should be evaluated on a project basis for seeding recommendations. Native shrubs may be successful on some of these sites not suited for grasses.

INTERPRETATIONS FOR ENGINEERING - PART 1

Land-type No.	Unified Classification	Suitability for Use as Topsoil Source	Suitability of Soil as Sand and/or Gravel Source	Suitability of Soil as a Possible Clay Source	Suitability of Bedrock for Road Rock	Limitations of Bedrock for Road Rock	Consideration for Road Location and Construction*	Method of Excavation	Cutbank & Ditch Erosion Potential	Susceptibility to Cutbank Sloughing and Ravelling
79	SMd	Unsuited	Unsuited	Unsuited	Good	N/A	Steep slopes	Blading and blasting	Moderate	Low
80	SMd, GW, GP	Unsuited	Suited (cinders)	Unsuited	Unsuited	N/A	Steep slopes on cinder cones	Blading	Low	High
81	SMd, GW, GP	Unsuited	Suited (cinders)	Unsuited	Unsuited	N/A	Steep slopes on cinder cones	Blading	Low	High
82	SMd, SW, SP, GW, GP	Unsuited	Suited (cinders)	Unsuited	Unsuited	N/A	Steep slopes on cinder cones	Blading	Moderate	High
83	SMd, SW, SP GW, GP	Unsuited	Suited (cinders)	Unsuited	Unsuited	N/A	Steep slopes on cinder cones	Blading	High to moderate	High
84	SMd, SW, SP	Unsuited	Unsuited, suited locally for cinders	Unsuited	Good to unsuited	Some material is too soft for road rock	Special precautions need to be taken to prevent damage from avalanches	Blading, ripping, and blasting	High	High to moderate
85	SMd, SP, SW	Unsuited	Unsuited, suited for cinders locally	Unsuited	Good to unsuited	Some of the material is too soft for road rock	No special considerations	Blading, ripping, and blasting	Moderate	Low
86	SMd	Unsuited	Unsuited, possible local cinder sources	Unsuited	Good to unsuited	Some of the material is too soft for road rock	Steep slopes	Blading, ripping, and blasting	Moderate	Low
87	SMd	Unsuited	Unsuited, possible local cinder sources	Unsuited	Good to unsuited	Some of the material is too soft for road rock	Steep slopes	Blading, ripping, and blasting	Moderate	Low
88	SMd, ML, SC, MH	Unsuited	Unsuited	Unsuited (Some deposits of diatomaceous earth)	Good to unsuited	Some materials are too soft for road rock	Materials are complex and detailed site investigation is necessary	Blading, ripping, and blasting	Moderate to high	Moderate to high
89	SMd, ML, SC, MH	Unsuited	Unsuited	Unsuited (some deposits of diatomaceous earth)	Good to unsuited	Some materials are too soft for road rock	Detailed site investigation is needed due to the complexity of the land.	Blading, ripping, and blasting	High	High
90	SMd, ML, SC	Unsuited	Suited locally, mostly unsuited	Unsuited	Fair to unsuited	Depth of overburden, materials too soft for road rock	Some clayey soil may be encountered	Blading, some ripping and blasting	Moderate	Low to moderate
91	SMd, ML	Unsuited	Unsuited	Unsuited	Good to fair	Some of the material is too soft for road rock	Steep slopes	Blading, ripping, and blasting	Moderate to high	Low
92	SMd, SW, SP, GP	Unsuited	Possible cinder source	Unsuited	Good	Depth of overburden	Cindery soils	Blading	Low	Moderate to high
93	SMd, SW, SP, GP	Unsuited	Possible cinder source	Unsuited	Good	Depth of overburden	Cindery soils	Blading	Low	Moderate to high
94	SMd, SP	Unsuited	Suited (sand)	Unsuited	Unsuited, some local spots may be suitable	Depth of overburden	Sandy soils	Blading, some blasting	High	N/A
95	SMd, SP	Unsuited	Suited (sand)	Unsuited	Unsuited	Depth of overburden	Sandy soils	Blading	High	N/A
96	SMd, SW, SP, GW	Unsuited	Suited	Unsuited	Unsuited	Depth of overburden	Pumice soils	Blading	Moderate to low	N/A

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INTERPRETATIONS FOR ENGINEERING - PART 2

Land-type No.	Probability of Cutbank Failures	Suggestions for Cutbank Stability Problems	Failure Potential on Road Waste and Fills	Erosion Potential on Road Waste and Fills	Suitability of Road Waste & Fill Slopes to Seeding	Limitations to Road Waste & Fill Slope Seeding	Suggestions for Road Waste & Fill Slope Seeding	Suitability of Cutbanks to Seeding	Limitations to Cutbank Seeding	Suggestions for Cutbank Seeding
79	I-II	Retaining structures may be applied locally	Low to moderate	Moderate to high	Good to fair	Low fertility, droughtiness	1/	Fair to good	Exposure of bedrock, steep slopes, some coarse soils	1/
80	II-III	Retaining structures may be applied	Moderate to low	Moderate	Poor to fair	Coarse textured, cindery soils; droughtiness	1/	Poor to unsuited	Coarse textured, cindery soils; droughtiness	1/, 2/
81	II-III	Retaining structures may be applied	Moderate to low	Moderate	Poor to fair	Coarse textured, cindery soils; droughtiness	1/	Poor to unsuited	Cindery soils, droughtiness	1/. 2/
82	II	Retaining structures may be applied	Low	Moderate	Poor	Coarse, cindery soils; low fertility	1/	Poor to unsuited	Cindery soils, ravelling	1/, 2/
83	II	Retaining structures may be applied	Moderate to low	High to moderate	Poor to unsuited	Cindery soil, low fertility, harsh climate	2/	Unsuited to poor	Cindery soil, low fertility, harsh climate, ravelling	2/
84	II-III	Retaining structures may be applied	Moderate	High to moderate	Poor to unsuited	Coarse textured soils, low fertility, harsh climate	2/	Unsuited to poor	Coarse textured soils, low fertility, harsh climate	2/
85	I	N/A	Low	Moderate to low	Poor	Coarse soils, low fertility, frost, dry summers	1/, 2/ Use sedges	Poor to unsuited	Coarse soils, low fertility, harsh climate, exposure of bedrock	1/, 2/ Use sedges
86	I-II	No special suggestions	Low	Moderate	Fair	Low fertility, droughty summers	1/	Fair to poor	Low fertility, bedrock exposures, droughty summers	1/
87	I-II	No special suggestions	Low	Moderate	Fair	Low fertility, droughtiness	1/	Fair to poor	Droughtiness, low fertility	1/
88	II-III	Retaining structures may be needed	Moderate	Moderate to high	Poor to fair	Low fertility, coarse soils, droughty	1/	Poor	Exposure of bedrock, low fertility, droughtiness	1/
89	II-IV	Retaining structures may be needed	Moderate to high	High to moderate	Fair to unsuited	Stony soils, low fertility, droughtiness	1/, 2/	Unsuited to poor	Exposure of bedrock, droughtiness	1/, 2/
90	II	Seed with grasses	Low to moderate	Moderate	Fair to good	Some coarse materials, droughtiness	1/	Fair	Droughtiness, low fertility	1/
91	I	No special suggestions	Low	Moderate to high	Fair to good	Droughtiness	1/	Fair	Droughtiness, exposure of bedrock	1/
92	I	N/A	Low	Low	Unsuited	Cindery soil, high elevation, frost heaving, low fertility	2/	Unsuited	Cindery soil, ravelling, frost heaving, high elevation, low fertility	2/
93	I	N/A	Low	Low	Unsuited to fair	Cindery soil, low fertility, droughtiness	1/, 2/	Unsuited	Cindery soil, ravelling, droughtiness	2/
94	N/A	N/A	N/A	High	Poor	Sandy soils, low fertility	1/	Poor	Sandy soils, low fertility, droughty summers	1/
95	N/A	N/A	N/A	High	Fair	Sandy soils, low fertility	1/	Poor to fair	Sandy soils, low fertility	1/
96	N/A	N/A	N/A	Moderate to low	Poor	Coarse pumice soils, low fertility, droughtiness	1/, 2/	Poor to unsuited	Coarse pumice soils, low fertility, droughtiness, ravelling	1/

1/ Prepare seed bed, fertilize, seed, and mulch, using species adapted to the climatic zone and moisture regime of the landtype. Periodic watering will be needed in many cases for grass establishment. Native shrubs should also be considered.

2/ Seeding success is questionable. Each site should be evaluated on a project basis for seeding recommendations. Native shrubs may be successful on some of these sites not suited for grasses.

INTERPRETATIONS FOR ENGINEERING - PART 1

Land-type No.	Unified Classification	Suitability for Use as Topsoil Source	Suitability of Soil as Sand and/or Gravel Source	Suitability of Soil as a Possible Clay Source	Suitability of Bedrock for Road Rock	Limitations of Bedrock for Road Rock	Consideration for Road Location and Construction*	Method of Excavation	Cutbank & Ditch Erosion Potential	Susceptibility to Cutbank Sloughing and Ravelling
97	SMd, SW, SP	Unsuited	Unsuited	Unsuited	Good	N/A	No special considerations	Blading and blasting	Moderate	Moderate
98	SMd, SW, SP	Unsuited	Unsuited	Unsuited	Good	N/A	No special considerations	Blading and blasting	Moderate	Moderate
1A	Not rated	Unsuited	Unsuited	Unsuited	Good	N/A	Steep rocky slopes limit road construction	Blasting and blading	Moderate to high	Moderate
2A	SMd, GP, GM	Unsuited	Unsuited	Unsuited	N/A	Depth of overburden	Coarse pumice surface soils	Blading	Low to moderate	N/A
2B	SMd, SP, SW, GP	Unsuited	Unsuited	Unsuited	N/A	Depth of overburden	Coarse pumice soils	Blading	Low to moderate	N/A
4A	SMd, SW	Unsuited	Suited	Unsuited	N/A	Depth of overburden	No special considerations	Blading	Moderate	N/A
4C	SMd	Unsuited	Some sites may be suitable	Unsuited	N/A	Depth of overburden	Flashy runoff occurs in this landtype	Blading	High	Moderate to low
5A	SMd, SW, SP	Unsuited	Unsuited	Unsuited	Unsuited to fair	Most of the material is too soft for road rock	Steep slopes, potential for high visual impact	Blading, ripping, and blasting	Moderate to high	High to moderate
6A	SMd	Unsuited	Unsuited	Unsuited	Good	Difficult to quarry and crush	No special considerations	Blading and blasting	Low to moderate	N/A
6B	SMd, SP	Unsuited	Unsuited	Unsuited	Good	Difficult to quarry and crush	Some stony sites	Blading and blasting	Low to moderate	N/A
6C	SMu, SMd, ML	Some sites are suitable, mostly unsuited	Unsuited	Unsuited	Good	Difficult to quarry and crush	Some stony sites	Blading and blasting	Moderate	N/A
6E	SMd	Unsuited	Unsuited	Unsuited	Unsuited (some good material may be found locally)	Depth of overburden	Some steep slopes, coarse pumice soil	Blading	Moderate	Moderate to high
6G	SMd, SP, SW	Unsuited	Unsuited	Unsuited	Good	Difficult to quarry and crush	No special considerations	Blading	Low to moderate	N/A
6H	SMd, SP, SW	Unsuited	Unsuited	Unsuited	Good	Difficult to quarry and crush	No special considerations	Blading, some blasting	Moderate	Low
6J	SMd, SP, SW	Unsuited	Unsuited	Unsuited	Good	Difficult to quarry and crush	Some rock outcrops are present	Blading and blasting	Moderate	N/A
7A	SMd, SP, (very stony)	Unsuited	Unsuited	Unsuited	Good to fair	Some soft materials	Rough, rocky land	Blading and blasting	Low	Moderate to low
7B	SMd, SW, SW (very stony)	Unsuited	Unsuited	Unsuited	Good	Difficult to quarry and crush	Rough, rocky land	Blading and blasting	Low	Moderate

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INTERPRETATIONS FOR ENGINEERING - PART 2

Land-type No.	Probability of Cutbank Failures	Suggestions for Cutbank Stability Problems	Failure Potential on Road Waste and Fills	Erosion Potential on Road Waste and Fills	Suitability of Road Waste & Fill Slopes to Seeding	Limitations to Road Waste & Fill Slope Seeding	Suggestions for Road Waste & Fill Slope Seeding	Suitability of Cutbanks to Seeding	Limitations to Cutback Seeding	Suggestions for Cutbank Seeding
97	I	N/A	Low	Moderate	Poor	Coarse pumice soils, droughtiness	1/	Poor to unsuited	Coarse textured pumice soils, low fertility, rock exposure, ravelling	2/
98	I	N/A	Low	Moderate	Poor	Coarse pumice soils, low fertility	1/	Poor to unsuited	Coarse textured pumice soils, low fertility, exposure of bedrock, ravelling	2/
1A	II	Retaining walls to prevent rock fall	Low to moderate	Moderate to high	Poor to unsuited	Coarse textured soils, stoniness, harsh climate	2/	Unsuited to poor	Coarse textured soils, bedrock exposure, harsh climate	2/
2A	N/A	N/A	N/A	Moderate to low	Unsuited to poor	Coarse textured pumice soils, frost heaving, low fertility	2/	Unsuited to poor	Coarse textured pumice soil, frost, low fertility	2/
2B	N/A	N/A	N/A	Moderate to low	Unsuited to poor	Coarse pumice soils	2/	Unsuited to poor	Coarse pumice soils, frost, low fertility	2/
4A	N/A	N/A	N/A	Moderate	Poor to fair	Coarse textured soils, low fertility, frost heaving	1/	Poor	Coarse textured soils, low fertility, droughtiness	1/
4C	I-II	Provide adequate drainage facilities	Low	High	Fair	Droughtiness, gravelly soils	1/	Fair	Droughtiness, gravelly soils	1/
5A	II	Local application of retaining structures	Moderate	High to moderate	Poor to unsuited	Coarse textured soils, harsh climate	2/	Unsuited to poor	Exposure of bedrock, coarse soils, low fertility	2/
6A	I	N/A	N/A	Low to moderate	Fair	Droughtiness, coarse textured soils, low fertility	1/	Fair	Exposed bedrock, coarse textured soils, droughtiness	1/
6B	I	N/A	N/A	Low to moderate	Fair	Coarse textured soils, low fertility, droughtiness	1/	Fair	Exposed bedrock, coarse soils, low fertility, droughtiness	1/
6C	I	N/A	N/A	Moderate	Good to fair	Droughtiness	1/	Fair	Droughtiness	1/
6E	I	N/A	Low	Moderate	Poor	Coarse textured soils, harsh climate	1/, 2/	Poor to unsuited	Coarse textured soils, droughtiness, ravelling	1/, 2/
6G	N/A	N/A	N/A	Low to moderate	Fair	Sandy soils, low fertility, frost heaving, droughtiness	1/	N/A	N/A	N/A
6H	I	N/A	Low	Moderate	Fair to poor	Coarse textured soils, frost heaving, droughtiness	1/	Poor to fair	Coarse textured soils, low fertility, ravelling, droughtiness	1/
6J	N/A	N/A	N/A	Moderate	Fair	Coarse textured soils, low fertility, droughtiness, frost heaving	1/	Fair to poor	Coarse textured soils of low fertility, droughtiness, ravelling	1/
7A	I	N/A	Low	Low to moderate	Poor to unsuited	Very stony soils	2/ Shrubs could be used	Unsuited	Very stony	2/
7B	I	N/A	Low	Low to moderate	Unsuited to poor	Coarse textured soils, very stony, harsh climate	2/	Unsuited to poor	Very stony, coarse soils, ravelling, harsh climate	2/

1/ Prepare seed bed, fertilize, seed, and mulch, using species adapted to the climatic zone and moisture regime of the landtype. Periodic watering will be needed in many cases for grass establishment. Native shrubs should also be considered.

2/ Seeding success is questionable. Each site should be evaluated on a project basis for seeding recommendations. Native shrubs may be successful on some of these sites not suited for grasses.

INTERPRETATIONS FOR ENGINEERING - PART 1

Land-type No.	Unified Classification	Suitability for Use as Topsoil Source	Suitability of Soil as Sand and/or Gravel Source	Suitability of Soil as a Possible Clay Source	Suitability of Bedrock for Road Rock	Limitations of Bedrock for Road Rock	Consideration for Road Location and Construction*	Method of Excavation	Cutbank & Ditch Erosion Potential	Susceptibility to Cutbank Sloughing and Ravelling
7C	GP	Unsuited	Unsuited	Unsuited	Good	Difficult to quarry and crush	Rough, rocky land	Blasting and blading	Low	Moderate to high
7E	SMd, SW, SP	Unsuited	Unsuited	Unsuited	Good to fair	Some soft pyroclastic material may be included	No special considerations	Blading and blasting	Moderate	Moderate to low
7F	SMd, SW, SP	Unsuited	Unsuited	Unsuited	Good to fair	Some soft pyroclastic material may be included	High elevations, some rock outcrops	Blading and blasting	Moderate	Low
7G	GP, GW, SMd	Unsuited	Unsuited (Possible some pumice gravel)	Unsuited	Unsuited to fair	Depth of overburden, soft materials	Likely to cause a high visual impact; light colored pumice soils	Blading, ripping, and blasting	Moderate	High
7H	SMd, SMd, SW	Unsuited	Unsuited	Unsuited	Good to poor	Some of the pyroclastic bedrock materials break down easily	Steep slopes	Blading, ripping, and blasting	Moderate to high	Low to moderate
7J	SMd, GP, SP	Unsuited	Suited	Unsuited	N/A	Depth of overburden	No special considerations	Blading	Low	N/A
7K	SMd, ML	Unsuited	Unsuited	Unsuited	Good	Some rock is difficult to quarry and crush	Steep slopes	Blading and blasting	Moderate to high	Low
7T	Not rated	Unsuited	Unsuited	Unsuited	Fair to good	Some pyroclastic material may be included	Narrow ridgetops	Blading and blasting	Moderate	Low
8A	SMd, SW, SP	Unsuited	Unsuited	Unsuited	Good to fair	Some soft pyroclastic material may be included	Roads may have a high visual impact	Blading and blasting	Moderate to high	High to moderate
8B	SMd, SP, SW	Unsuited	Unsuited	Unsuited	Good to unsuited	Some of the material is too soft for road rock	No special considerations	Blading, ripping, and blasting	Moderate	Moderate to low
8C	Not rated	Unsuited	Locally suited for cinders	Unsuited	Good to unsuited	Much of the bedrock is too soft for road rock	Potential impact to water quality, high visual impact	Blading, ripping, and blasting	Moderate to high	High to moderate
8E	Not rated	Unsuited	Unsuited	Unsuited	Unsuited to fair	Soft materials	High erosion potential	Blading and ripping, some blasting	High	High to moderate
8F	GW, GP	Unsuited	Suited	Unsuited	N/A	Depth of overburden	Coarse pumice soils on steep slopes, visual impact	Blading	Moderate	High
8T	Not rated	Unsuited	Unsuited	Unsuited	Unsuited to fair	Pyroclastic bedrock materials break down under traffic	Steep slopes, high potential for visual impact	Blading and ripping, some blasting	Moderate to high	Moderate to high
9A	SMd, SW, SP, GP	Unsuited	Unsuited	Unsuited	Good to poor	Depth of overburden, some soft materials, stratified volcanics	Pumice soils, steep slopes	Blading and some blasting	High to moderate	High
9B	SMd, GP, SW, SP	Unsuited	Unsuited	Unsuited	Unsuited to good	Depth of overburden, some soft materials, stratified volcanics	Steep slopes, pumice soils	Blading and some blasting	High to moderate	High
9C	SMd, GP, SW, SP	Unsuited	Unsuited	Unsuited	Unsuited to good	Depth of overburden, stratified volcanics including some soft materials	Steep slope, pumice soils	Blading and some blasting	High to moderate	High
9F	SMd, GP, SW, SP	Unsuited	Suited locally for outwash gravel or sand	Unsuited	N/A	Depth of overburden	Coarse pumice soils	Blading	Moderate	Moderate
9G	SMd, SW, SP GM	Unsuited	Unsuited, locally for gravel	Unsuited	N/A	Depth of overburden	Some seepy spots over the compact glacial till	Blading and ripping	Moderate to high	Moderate
9J	SMd, SW, SP, GM	Unsuited	Unsuited	Unsuited	N/A	Depth of overburden	Some seepy spots over the compact glacial till	Blading and ripping	High	Moderate to high

* Dustiness is an item to consider on all roads except on rough, rocky land and wet areas. Surfacing or dust abatement materials should be applied when dust conflicts with other values.

INTERPRETATIONS FOR ENGINEERING - PART 2

Land-type No.	Probability of Cutbank Failures	Suggestions for Cutbank Stability Problems	Failure Potential on Road Waste and Fills	Erosion Potential on Road Waste and Fills	Suitability of Road Waste & Fill Slopes to Seeding	Limitations to Road Waste & Fill Slope Seeding	Suggestions for Road Waste & Fill Slope Seeding	Suitability of Cutbanks to Seeding	Limitations to Cutbank Seeding	Suggestions for Cutbank Seeding
7C	I	N/A	Low	Low	Unsuited	Coarse pumice soils	2/	Unsuited	Coarse pumice soil	2/
7E	I	N/A	Low	Moderate to low	Poor	Coarse textured soils, frost heaving, low fertility, droughty summers	1/	Poor	Coarse textured soils, low fertility, harsh climate	2/
7F	I	N/A	Low	Moderate	Poor	Coarse textured soils, low fertility	1/, 2/	Poor	Coarse textured soils, exposure of bedrock, low fertility	2/, 2/
7G	I-II	No special suggestions	Low	Moderate	Unsuited	Coarse textured pumice	2/	Unsuited	Coarse textured pumice, ravelling	2/
7H	I	N/A	Low	Moderate to high	Fair to good	Droughtiness, some coarse textured soils	1/	Fair	Coarse textured soils, droughtiness	1/
7J	N/A	N/A	N/A	Low	Poor	Coarse pumice soils	1/, 2/	Poor to unsuited	Coarse pumice soils	2/
7K	I	N/A	Low	Moderate to high	Fair	Droughtiness	1/	Fair	Droughtiness, exposure of bedrock	1/
7T	I	N/A	Low	Moderate to high	Fair	Droughtiness	1/	Fair	Droughtiness	1/
8A	I-II	No special suggestions	Moderate	Moderate to high	Unsuited to poor	Coarse pumice soils, low fertility	2/	Unsuited to poor	Coarse pumice soils, low fertility	2/
8B	I	N/A	Low	Moderate	Poor	Coarse soils, low fertility, frost heaving, droughty summers	1/, 2/	Poor to unsuited	Coarse soils, low fertility, exposure of bedrock	2/
8C	II-III	Retaining structures may be applied	Moderate	High to moderate	Unsuited to poor	Coarse soils, harsh climate, droughtiness	1/, 2/	Unsuited to poor	Coarse soils, low fertility, droughtiness, harsh climate	2/
8E	II-III	Retaining structures to reduce ravelling	Moderate	High	Poor to unsuited	Coarse soils, erosion potential, harsh climate	2/	Unsuited to poor	Coarse soils, erosion potential, harsh climate	2/
8F	II-III	Retaining structures to reduce ravel and sloughing	Low	Moderate	Unsuited	Coarse pumice soil	2/	Unsuited	Coarse pumice soil	2/
8T	II	Retaining structures to reduce ravel and sloughing	Low	Moderate	Fair to unsuited	Coarse pumice soils, low fertility, droughtiness, harsh climate	1/, 2/	Poor to unsuited	Coarse pumice soils, exposed bedrock	2/
9A	I-II	N/A	Low	High to moderate	Poor	Coarse textured pumice soils	1/, 2/	Poor	Coarse textured pumice soils	1/, 2/
9B	II	No special suggestions	Low to moderate	High	Poor	Coarse pumice soils	2/	Poor to unsuited	Coarse pumice soils, ravelling	2/
9C	I-II	No special suggestions	Low	High to moderate	Poor	Coarse pumice soils	2/	Poor to unsuited	Coarse pumice soils, ravelling	2/
9F	I	N/A	Low	Moderate	Fair to poor	Coarse pumice soils, frost heaving	1/, 2/	Poor	Coarse pumice soils	2/
9G	II	Provide adequate drainage facilities	Low	Moderate	Poor to fair	Coarse pumice soils	1/, 2/	Poor	Coarse pumice soils, some compact glacial till	2/
9J	II	Provide adequate drainage facilities	Low to moderate	High	Poor to fair	Coarse pumice soils	1/, 2/	Poor	Coarse pumice soils, exposure of compact glacial till	1/, 2/

1/ Prepare seed bed, fertilize, seed, and mulch, using species adapted to the climatic zone and moisture regime of the landtype. Periodic watering will be needed in many cases for grass establishment. Native shrubs should also be considered.

2/ Seeding success is questionable. Each site should be evaluated on a project basis for seeding recommendations. Native shrubs may be successful on some of these sites not suited for grasses.

INTERPRETATIONS FOR ENGINEERING - PART 1

Land-type No.	Unified Classification	Suitability for Use as Topsoil Source	Suitability of Soil as Sand and/or Gravel Source	Suitability of Soil as a Possible Clay Source	Suitability of Bedrock for Road Rock	Limitations of Bedrock for Road Rock	Consideration for Road Location and Construction*	Method of Excavation	Cutbank & Ditch Erosion Potential	Susceptibility to Cutbank Sloughing and Ravelling
9K	SMd, GP, SP	Unsuited	Unsuited	Unsuited	N/A	Depth of overburden	Coarse pumice soils	Blading	Moderate	Moderate
9L	SMd, GP, SP	Unsuited	Unsuited	Unsuited	N/A	Depth of overburden	Coarse pumice soils	Blading	Moderate	Moderate to high
9M	SMd, GP, SP	Unsuited	Unsuited	Unsuited	N/A	Depth of overburden	Coarse pumice soils	Blading	Moderate	Moderate to high
9N	SMd, GP, SP	Unsuited	Unsuited	Unsuited	Local sites may be suitable	Depth of overburden	High visual impact	Blading, possibly some blasting	High	High
9P	SMd, GP, SW, SP	Unsuited	Unsuited	Unsuited	May be suited locally	Depth of overburden	Pumice soil is unstable within this landtype, high visual and resource impacts from roads	Blading, possibly some blasting	High	High
9R	SMd, GP, SW, SP	Unsuited	Unsuited	Unsuited	May be suited locally	Depth of overburden	Steep slopes, pumice soil	Blading, possibly some blasting	High	High
9S	SMd, GP, GW, SP	Unsuited	Unsuited	Unsuited	May be suited locally	Depth of overburden	Steep slopes, pumice soil	Blading, possibly some blasting	High	High
9T	SMd, GP, SP	Unsuited	Suited (cinders)	Unsuited	N/A	Depth of overburden	Coarse pumice soils on cinder cones, visual impacts	Blading	High to moderate	High
9U	SMd, GP, GW, SP, SW	Unsuited	Suited (sand and gravel)	Unsuited	Some sites may be suitable	Depth of overburden	Coarse pumice soils	Blading	Moderate	Moderate to high
9V	SMd, GP, SP	Unsuited	Unsuited	Unsuited	Good to fair	Difficult to quarry and crush	Rough, rocky land	Blading and blasting	Low	Moderate
9W	SMd, GP, SP	Unsuited	Unsuited	Unsuited	N/A	Depth of overburden	Coarse pumice soils	Blading	Moderate	Moderate
9X	SMd, GP, SP, SW	Unsuited	Suited locally for sand or gravel	Unsuited	N/A	Depth of overburden	Coarse pumice soil on steep slopes	Blading	Moderate	High
9Y	SMd, GP, SP	Unsuited	Unsuited	Unsuited	N/A	Depth of overburden	Coarse pumice soils, wet spots are common	Blading, some ripping	High	High
9Z	SMd, GP, SP	Unsuited	Unsuited	Unsuited	Good to fair	Depth of overburden, and some soft materials	Coarse pumice soils on steep slopes	Blading and blasting	High	Moderate

* Dustiness is an item to consider on all roads except on rough, rocky land and wet areas. Surfacing or dust abatement materials should be applied when dust conflicts with other values.

INTERPRETATIONS FOR ENGINEERING - PART 2

Land-type No.	Probability of Cutbank Failures	Suggestions for Cutbank Stability Problems	Failure Potential on Road Waste and Fills	Erosion Potential on Road Waste and Fills	Suitability of Road Waste & Fill Slopes to Seeding	Limitations to Road Waste & Fill Slope Seeding	Suggestions for Road Waste & Fill Slope Seeding	Suitability of Cutbanks to Seeding	Limitations to Cutbank Seeding	Suggestions for Cutbank Seeding
9K	I-II	No special suggestions	Low	Moderate	Poor to unsuited	Coarse pumice soils, high elevations	2/	Poor to unsuited	Coarse pumice soils, high elevations, ravelling	2/
9L	N/A	N/A	Low	Moderate	Poor	Coarse pumice soils, low fertility, droughtiness, frost heaving	1/, 2/	Poor	Coarse pumice soils, low fertility, ravelling	2/
9M	N/A	N/A	Low	Moderate	Poor	Coarse pumice soils, low fertility, frost heaving	1/, 2/	Poor	Coarse pumice soils, low fertility, ravelling	2/
9N	II	Retaining structures may be used to reduce ravelling	Low to moderate	High	Poor	Coarse pumice soils, low fertility, ravelling, climatic conditions	1/, 2/	Poor to unsuited	Coarse pumice soils, ravelling, climatic conditions	2/
9P	III	Retaining structures may be used	Moderate to high	High	Poor	Coarse pumice soils	2/	Poor to unsuited	Coarse pumice soils, ravelling	2/
9R	II	Retaining structures may be used	Moderate	High	Poor	Coarse pumice soils, droughtiness	2/	Poor to unsuited	Coarse pumice soils, ravelling, droughtiness	2/
9S	II	Retaining structures may be used	Moderate	High	Poor	Coarse pumice soils, droughtiness	2/	Poor to unsuited	Coarse pumice soils, ravelling, droughtiness	2/
9T	II	Retaining structures may be used to prevent ravelling	Moderate to low	High to moderate	Poor	Coarse pumice soils	2/	Unsuited to poor	Coarse pumice soils, ravelling	2/
9U	I	N/A	Low	Moderate	Poor to unsuited	Coarse pumice soils, harsh climate, low fertility	2/	Poor to unsuited	Coarse pumice soils, ravelling, low fertility	2/
9V	I	N/A	Low	Low	Poor to unsuited	Stony, coarse textured pumice soils	2/	Poor to unsuited	Stony, coarse textured pumice soils	2/
9W	I-II	N/A	Low	Moderate	Poor to unsuited	Coarse pumice soils, high elevations, low fertility	2/	Poor to unsuited	Coarse pumice soils, harsh climate, ravelling	2/
9X	I-II	No special suggestions	Low	Moderate	Poor to unsuited	Coarse pumice soil, harsh climate	2/	Unsuited to poor	Coarse pumice soil, ravelling, climatic conditions	2/
9Y	II	Provide adequate drainage; some retaining structures may be needed locally	Low to moderate	High	Poor	Coarse pumice soil	2/	Unsuited to poor	Coarse pumice soil, ravelling, frost heaving	2/
9Z	I	N/A	Low	Moderate to high	Poor	Coarse pumice soils, low fertility, climatic conditions	1/, 2/	Poor	Coarse pumice soils, some bedrock exposures	2/

1/ Prepare seed bed, fertilize, seed, and mulch, using species adapted to the climatic zone and moisture regime of the landtype. Periodic watering will be needed in many cases for grass establishment. Native shrubs should also be considered.

2/ Seeding success is questionable. Each site should be evaluated on a project basis for seeding recommendations. Native shrubs may be successful on some of these sites not suited for grasses.

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST
PART 1
INTERPRETATIONS FOR RECREATION

Landtype No.	Landtype Suitability for Recreation Area Development	Landtype Limitations for Recreation Development	Treatment to Increase Suitability	Soil and Site Damage Susceptibility	Susceptibility to Dustiness
1	Unsuited	Stoniness, lack of soil, lack of vegetation	N/A	N/A	N/A
2	Unsuited	Shallow watertable	N/A	N/A	N/A
3	Unsuited	Steep slopes, rocky, high elevation, lack of vegetation	N/A	N/A	N/A
4	Low to unsuited	High elevation, fragile soils and vegetation	N/A	High	Moderate
5	Unsuited to low	Wetness and shallow watertable	N/A	Moderate to high	Moderate to low
6	Unsuited	Steep, rocky slopes	N/A	N/A	N/A
7	Low	Cold sites, nonforested, lack of ground cover	N/A	Low	High
8	Unsuited to moderate	High watertable, periodic flooding	N/A	High to moderate	Low to moderate
9	Unsuited	Steep slopes, cindery soils	N/A	N/A	N/A
10	Unsuited	Steep slopes	N/A	N/A	N/A
11	Unsuited to low	Stoniness	N/A	Low	Low
12	Unsuited to low	Steep, uneven slopes	N/A	Moderate	Moderate
13	Unsuited	Steep, rocky slopes	N/A	N/A	N/A
14	Unsuited	Steep, rocky slopes	N/A	N/A	N/A
15	Low	Cold sites, sparse vegetation, coarse soils	N/A	Moderate	High
16	Moderate	Some steep slopes, loose soils	Ground leveling	Moderate	High
17	High to moderate	Loose soils	N/A	Moderate	Moderate to high
18	Unsuited	Steep slopes	N/A	N/A	N/A
19	High to moderate	Loose soils, dustiness	Establish grasses and irrigate	Moderate	High
20	Variable	Wetness, steep slopes, nearness to water bodies	N/A	Moderate	Moderate
21	Unsuited	Steep slopes	N/A	N/A	N/A
22	Unsuited	Steep slopes	N/A	N/A	N/A
23	Unsuited	Steep slopes	N/A	N/A	N/A
24	Unsuited	Steep slopes, unstable soils	N/A	N/A	N/A
25	Moderate to low	Steep slopes and loose soils	Select gentle slopes	Moderate	High
26	Moderate to low	Loose soils	Locate away from drainages	Moderate	High
27	Low to unsuited	Steep slopes	N/A	High	High
28	Moderate to low	Steep slopes, uneven land	Select gentle slopes, some leveling	Moderate	High to moderate
29	High to moderate	Loose soils	Establish grasses and irrigate	Low to moderate	High to moderate
30	Unsuited to low	Wetness	N/A	Moderate	Low to moderate
31	Unsuited	Steep slopes and loose soils	N/A	N/A	N/A
32	Moderate to high	Loose soils and dustiness	Hard surfacing	Low to moderate	High
33	Moderate	Cindery soils	Add topsoil	Low	Moderate to low
34	Unsuited	Steep slopes and loose soils	N/A	N/A	N/A

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST
PART 2
INTERPRETATIONS FOR RECREATION

Landtype No.	Susceptibility to Muddiness	Trail Suitability	Limitations for Trails	Considerations for Trail Improvements and Protection	Suitability for Sewage Filter Field	Soil Limitations to Sewage Filter Field Use
1	N/A	Low	Stoniness	N/A	Unsuited	Stoniness
2	N/A	Moderate	Wetness	Build up subgrade, provide drainage puncheon for short section	Unsuited	Shallow watertable
3	N/A	Unsuited	Steep, rocky slopes	N/A	Unsuited	Steep, rocky slopes
4	Moderate	Moderate	Erosion hazard	Waterbars	Moderate	Excessively coarse textured materials
5	High to moderate	Moderate to unsuited	Wetness	Build up subgrade, provide drainage, surfacing	Unsuited	Shallow watertable
6	N/A	Unsuited	Steep rocky slopes	N/A	Unsuited	Steep slopes
7	Low	Moderate	Loose, dusty soils	Surfacing	Well	N/A
8	Moderate	Low to high	Wetness, periodic flooding	Build up subgrade, provide drainage, surfacing	Unsuited to poor	Shallow watertable
9	N/A	Unsuited	Steep slopes and loose soils	N/A	Unsuited	Steep slopes and very porous material
10	N/A	Unsuited to low	Steep slopes and loose soils	Benching, contour on the slope	Unsuited	Steep slopes, depth to bedrock
11	Low	Low	Stoniness, uneven landform	N/A	Unsuited	Stoniness
12	Low	Low to moderate	Steep, uneven slopes; loose soils	Waterbars	Unsuited to poor	Depth to bedrock and steep slopes
13	N/A	Unsuited	Steep, rocky slopes	N/A	Unsuited	Steep, rocky slopes
14	N/A	Unsuited to low	Steep, rocky slopes	N/A	Unsuited	Steep, rocky slopes
15	Low	High to moderate	Loose soils, dustiness, frost heaving	N/A	Well	Depth to bedrock in local situations
16	Low	Moderate	Some steep slopes	Waterbars and some contouring	Moderate to poor	Compact glacial till layer
17	Low	High to moderate	Loose soils	Waterbars, surfacing	Well to moderate	Depth to compact glacial till
18	N/A	Unsuited	Steep slopes	N/A	Unsuited	Steep slopes
19	Low	High to moderate	Loose, dusty soils	Waterbars, surfacing	Well to moderate	Locally shallow to compact till
20	Low to moderate	High	Local steep slopes	Waterbars	Poor to moderate	Proximity to water bodies, locally shallow to bedrock or compact till
21	N/A	Low	Steep slopes	Contour on the slope, waterbars	Unsuited	Steep slopes, compact till layer
22	N/A	Low	Steep slopes	Contour on the slope, waterbars	Unsuited	Steep slopes, compact till layer
23	N/A	Unsuited to low	Steep slopes	N/A	Poor	Steep slopes, compact till layer, subject to runoff
24	N/A	Low	Steep slopes	Avoid wet spots, waterbars	Unsuited	Steep slopes and wet spots
25	Low	Moderate	Some steep slopes and loose soils	Waterbars	Poor to moderate	Steep slopes, some areas have compact till at relatively shallow depths
26	Low	Moderate	Loose soils	Waterbars	Moderate	Subsurface runoff over compact till
27	Low	Low to moderate	Steep slopes	Waterbars, contour on the slope	Poor to unsuited	Steep slopes, some areas have compact till at relatively shallow depths
28	Low	Low to moderate	Steep slopes	Waterbars, avoid steep pitches	Poor	Steep slopes, compact till at relatively shallow depths
29	Low	High	Loose soils	Waterbars, surfacing	Well	Compact till may be within 60 inches in some areas
30	High to moderate	Low	Wetness	Build up subgrade and provide drainage	Unsuited	Wetness
31	Low	Low to unsuited	Steep slopes and loose soils	Contour on the slope, waterbars, retaining walls	Unsuited	Steep slopes
32	Low	High to moderate	Loose soils, dusty	Hard surfacing, waterbars	Well	N/A
33	Low	High	Loose soils until compacted	N/A	Well to moderate	Excessive drainage
34	N/A	Low	Steep slopes and loose soils	Contour on the slopes	Unsuited to poor	Steep slopes

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST
PART 1
INTERPRETATIONS FOR RECREATION

Land-type No.	Landtype Suitability for Recreation Area Development	Landtype Limitations for Recreation Development	Treatment to Increase Suitability	Soil and Site Damage Susceptibility	Susceptibility to Dustiness
35	Unsuited	Steep slopes, loose soils, exposed aspect	N/A	N/A	N/A
36	High to moderate	Droughty sites; loose, dusty soils	Establish grass and irrigate	Moderate	High
37	High	Loose soils and dustiness	Establish grass and irrigate	Moderate to low	High
38	Unsuited	Steep slopes and loose, erosive soils	N/A	N/A	N/A
39	High to moderate	Dustiness	Establish grass and irrigate	Low to moderate	High
40	Low to unsuited	High watertable and periodic flooding	N/A	High to moderate	Low to high
41	Moderate to high	Loose soils, dusty	Establish grass and irrigate	Low to moderate	High
42	High	Loose, dusty soils	Establish grass and irrigate	Low to moderate	High to moderate
43	Unsuited	High watertable	N/A	N/A	N/A
44	Moderate	High watertable, compaction	Establish grass and irrigate	Low to moderate	Moderate to high
45	Moderate	Loose, dusty soils: compaction; frost	Establish grass and irrigate	Moderate	High
46	Moderate	Loose, dusty soils; compaction: frost	Establish grass and irrigate	Moderate to high	High
47	Moderate	Loose, dusty soils	N/A	Moderate	High
48	Low	Lack of tree cover, droughty, dusty	N/A	Moderate	High
49	Unsuited	Steep slopes, droughtiness, lack of tree cover	N/A	N/A	N/A
50	Unsuited	Steep slopes, shallow soils	N/A	N/A	N/A
51	Unsuited	Steep slopes, erosive soils	N/A	N/A	N/A
52	Unsuited	Steep slopes, erosive soils	N/A	N/A	N/A
53	Unsuited to low	Lack of ground cover, stoniness	N/A	Moderate	Moderate
54	Moderate to high	Erosive soils and depth to bedrock	Establish grass and irrigate	Moderate	High
55	Moderate to high	Erosive soils and depth to bedrock	Establish grass and irrigate	Moderate	High
56	Low to moderate	Loose, dusty soils	Establish grass and irrigate	Moderate	High
57	Unsuited	Steep slopes and loose soils	N/A	N/A	N/A
58	Unsuited	Steep slopes and loose soils	N/A	N/A	N/A
59	Unsuited	Steep, rocky slopes	N/A	N/A	N/A
60	Moderate	Droughty sites, dusty	Grass seeding and irrigation, some stone clearing	Moderate	High
61	Moderate	Dustiness, relatively dry sites	Grass establishment and irrigation	Moderate to low	High
62	High to moderate	Dustiness	Grass establishment and irrigation	Moderate to low	High
63	Moderate	Loose, coarse-textured soils; sensitive ground cover, compaction	Grass establishment and irrigation	Moderate	High
64	Moderate	Loose, dusty soils	Grass establishment and irrigation	Moderate	High
65	Moderate to high	Loose, dusty soils; some steep slopes	N/A	Moderate	High
66	Moderate to high	Loose, dusty soils and some steep slopes	N/A	Moderate	High

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST
PART 2
INTERPRETATIONS FOR RECREATION

Land-type No.	Susceptibility to Muddiness	Trail Suitability	Limitations for Trails	Considerations for Trail Improvements and Protection	Suitability for Sewage Filter Field	Soil Limitations to Sewage Filter Field Use
35	N/A	Low	Steep slopes and loose soils	Contour on the slopes, waterbars	Unsuited to poor	Steep slopes
36	Low	High to moderate	Loose soils	N/A	Well	N/A
37	Low	High	Dustiness	Surfacing	Well	A high watertable in some spots, especially near meadows
38	N/A	Low	Steep slopes and loose, erosive soils	Contour on slopes, retaining walls, surfacing, waterbars	Unsuited	Steep slopes
39	Low	High to moderate	Dustiness	Surfacing	Moderate	Watertable and slowly permeable layer
40	Moderate to high	Low to high	Wetness	Bridging over wet spots and drainageways, build up subgrade and provide drainage	Unsuited to poor	High watertable
41	Low	High to moderate	Dustiness and loose soils	Waterbars, surfacing	Well	N/A
42	Low	High to moderate	Dustiness	Waterbars, surfacing	Well	N/A
43	N/A	Low to unsuited	Wetness	Build up subgrade and provide drainage, surfacing	Unsuited	High watertable
44	Low	High to moderate	Dustiness	Surfacing	Poor to unsuited	High watertable
45	Low	Moderate to high	Dustiness	Surfacing	Well	Locally high watertable
46	Low	Moderate to high	Dustiness	Surfacing	Well	N/A
47	Low	Moderate	Dustiness	Surfacing	Well	N/A
48	Low	Low to moderate	Dusty, loose soils	N/A	Well	N/A
49	N/A	Low to unsuited	Steep slopes, erosive soils	N/A	Poor to unsuited	Steep slopes
50	N/A	Unsuited to low	Steep slopes and shallow, erosive soils	N/A	Unsuited	Steep slopes and shallow soils
51	N/A	Low	Steep slopes and erosive soils	Contour on the slope, waterbars	Unsuited	Steep slopes and depth to bedrock
52	N/A	Low	Steep slopes and erosive soils	Contour on the slope, waterbars	Unsuited	Steep slopes and depth to bedrock
53	Low to high (spring & fall)	Moderate	Muddy spots	Surfacing	Unsuited to poor	Shallow depth to bedrock, some clayey soils
54	Moderate	High to moderate	Erosive soils	Surfacing, waterbars	Poor	Depth to bedrock
55	Moderate	High to moderate	Erosive soils	Surfacing, waterbars	Poor	Depth to bedrock
56	Low	Moderate	Loose, dusty soils	Surfacing	Poor to moderate	Depth to bedrock
57	N/A	Low to unsuited	Steep slopes and loose soils	Contour on the slope, waterbars, surfacing	Unsuited	Steep slopes and depth to bedrock
58	N/A	Low to unsuited	Steep slopes and loose soils	Contour on the slope, waterbars, surfacing	Unsuited	Steep slopes and depth to bedrock
59	N/A	Low to unsuited	Steep slopes	Contour on the slope, waterbars, surfacing	Unsuited	Steep slopes and depth to bedrock
60	Low	Moderate to high	Loose, dusty soils	Surfacing	Poor	Depth to bedrock
61	Low	High to moderate	Dustiness	Surfacing, waterbars	Moderate	Depth to bedrock, medium-textured subsoil
62	Low to moderate	High	Dustiness	Surfacing, waterbars	Moderate	Depth to bedrock, fine-textured bedrock
63	Low	High to moderate	Dustiness, loose soils	N/A	Moderate to poor	Depth to bedrock
64	Low	Moderate	Loose soils and dustiness	Waterbars, surfacing	Moderate	Depth to bedrock
65	Low	High to moderate	Loose, dusty soils	Waterbars	Moderate	Depth to bedrock
66	Low	High to moderate	Loose soils	Waterbars	Moderate	Depth to bedrock

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DESCHUTES NATIONAL FOREST
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Land-type No.	Landtype Suitability for Recreation Area Development	Landtype Limitations for Recreation Development	Treatment to Increase Suitability	Soil and Site Damage Susceptibility	Susceptibility to Dustiness
67	Moderate to high	Loose, dusty soils; some steep slopes	N/A	Moderate to low	High
68	Unsuited	Steep slopes, loose soils, depth to bedrock	N/A	N/A	N/A
69	Unsuited	Steep slopes and erosive soils	N/A	N/A	N/A
70	Moderate	Cold sites; fragile ground cover; loose, dusty soils	Grass establishment and irrigation	Moderate	High
71	Low to unsuited	Steep slopes and erosive soils	N/A	High	High
72	Moderate	Droughty; loose, dusty soils; sensitive ground cover	Grass seeding and irrigation	Moderate	High
73	Moderate to low	Cold sites, loose soils	N/A	Moderate	High to moderate
74	Low	Rough, rocky land; lava flows	N/A	Low	Low to moderate
75	Low	Rough, rocky land; droughty; lava flows	N/A	Low	Low to moderate
76	Low	Rough, rocky land; lava flows	N/A	Low	Low to moderate
77	Low to unsuited	Rough, rocky land; lava flows	N/A	Low	Low to moderate
78	Unsuited	Steep slopes, erosive soils	N/A	N/A	N/A
79	Unsuited	Steep slopes, erosive soils	N/A	N/A	N/A
80	Unsuited	Steep slopes, loose soils, droughty	N/A	N/A	N/A
81	Unsuited	Steep slopes and loose, erosive soils; exposed sites	N/A	N/A	N/A
82	Unsuited	Steep slopes and loose, erosive soils	N/A	N/A	N/A
83	Unsuited	Steep slopes and loose, erosive soils; high elevations	N/A	N/A	N/A
84	Unsuited	Steep slopes, erosive soils, high elevations	N/A	N/A	N/A
85	Moderate to low	High elevations, sparse ground cover, some steep slopes	N/A	Moderate to low	Moderate
86	Unsuited	Steep slopes	N/A	N/A	N/A
87	Unsuited	Steep slopes, exposed aspect	N/A	N/A	N/A
88	Unsuited	Steep slopes, erosive soils	N/A	N/A	N/A
89	Unsuited	Steep, rocky slopes; erosive soils	N/A	N/A	N/A
90	Moderate to high	Some erosion problems and steep slopes	Grass seeding and irrigation	Moderate	High
91	Unsuited	Unforested, steep slopes; erosive soils	N/A	N/A	N/A
92	Low	Loose, coarse-textured soils; cindery surface; sparse ground cover; high elevations	N/A	Moderate	High to moderate
93	Moderate	Loose, cindery soils; sensitive ground cover	Add topsoil, establish grasses and irrigate	Moderate	High to moderate
94	Low	Sandy soils, high elevations, some steep slopes	N/A	High	High to moderate
95	Low	Sandy soils, erosive, some steep slopes	Grass establishment and irrigation	High to moderate	High

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INTERPRETATIONS FOR RECREATION

Land-type No.	Susceptibility to Muddiness	Trail Suitability	Limitations for Trails	Considerations for Trail Improvements and Protection	Suitability for Sewage Filter Field	Soil Limitations to Sewage Filter Field Use
67	Low	High to moderate	Loose soils	Waterbars	Moderate	Depth to bedrock
68	N/A	Unsuited to low	Steep slopes and loose, erosive soils	Contour on the slope, waterbars, surfacing	Unsuited	Steep slopes and depth to bedrock
69	N/A	Unsuited to low	Steep slopes and loose, erosive soils	Contour on the slope, waterbars, surfacing	Unsuited	Steep slopes and depth to bedrock
70	Low	Moderate to high	Dusty soils, frost heaving	Surfacing	Moderate	Depth to bedrock, excessive drainage
71	Low to moderate	Moderate	Moderately steep slopes, erosive soils	Surfacing	Poor to unsuited	Steep slopes and depth to bedrock
72	Low	Moderate	Loose, dusty soils	Surfacing	Poor to moderate	Depth to bedrock
73	Low	High to moderate	Dustiness	Waterbars on up-slope trails, surfacing	Moderate to poor	Depth to bedrock
74	Low	Moderate to low	Rough, stony land	N/A	Unsuited to poor	Stoniness and depth to bedrock
75	Low	Moderate to low	Rough, stony land	N/A	Unsuited to poor	Stoniness and depth to bedrock
76	Low	Moderate to low	Rough, stony land	N/A	Unsuited to poor	Stoniness and depth to bedrock
77	Low	Moderate to low	Rough, stony land	N/A	Unsuited to poor	Stoniness and depth to bedrock, excessive drainage
78	Low	Low to unsuited	Steep slopes, erosive soils	Contour on the slope, waterbars, surfacing	Unsuited	Steep slopes, depth to bedrock
79	Low	Low to unsuited	Steep slopes, erosive soils	Contour on the slope, waterbars, surfacing	Unsuited	Steep slopes, depth to bedrock
80	Low	Unsuited to low	Steep slopes; loose, erosive soils	Contour on the slope, waterbars	Unsuited	Steep slopes, excessive drainage
81	N/A	Unsuited to low	Steep slopes and loose, erosive soils	Contour on the slope, waterbars, surfacing	Unsuited to poor	Steep slopes, excessive drainage
82	N/A	Unsuited to low	Steep slopes and loose, erosive soils	Contour on the slope, waterbars, surfacing	Unsuited to poor	Steep slopes
83	N/A	Unsuited to low	Steep slopes and loose, erosive soils	Contour on the slope, waterbars, surfacing	Unsuited	Steep slopes
84	N/A	Low to unsuited	Steep slopes	Contour on the slope, waterbars, surfacing	Unsuited	Steep slopes, depth to bedrock
85	Low	High to moderate	N/A	Waterbars	Poor	Depth to bedrock, some steep slopes
86	N/A	Low	Steep slopes	Waterbars, contour on the slope	Unsuited	Steep slopes, depth to bedrock
87	N/A	Low	Steep slopes	Waterbars, contour on the slope	Unsuited	Steep slopes, depth to bedrock
88	N/A	Low to unsuited	Steep slopes, erosive soils	Contour on the slopes, waterbars, surfacing	Unsuited	Steep slopes, depth to bedrock
89	N/A	Unsuited	Steep, rocky slopes and erosive soils	N/A	Unsuited	Steep slopes and depth to bedrock
90	Low to moderate	High	N/A	Waterbars	Moderate	May be some subsurface waterflow
91	N/A	Low	Steep slopes	Contour on the slope, waterbars, surfacing	Unsuited	Steep slopes, depth to bedrock
92	Low	Moderate to high	Loose soils, erosion	Waterbars	Well	Excessive drainage
93	Low	High to moderate	Loose soils	N/A	Well	Excessive drainage
94	Low	Moderate	Loose, sandy soils	Waterbars, surfacing	Moderate	Excessive drainage, compact fill layer
95	Low	Moderate	Loose, sandy soils	Waterbars, surfacing	Moderate	Excessive permeability in surface, compact fill layer

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Land-type No.	Landtype Suitability for Recreation Area Development	Landtype Limitations for Recreation Development	Treatment to Increase Suitability	Soil and Site Damage Susceptibility	Susceptibility to Dustiness
96	Moderate	Loose, dusty soils; sensitive ground cover; compaction and insufficient slope for good drainage	Grass establishment and irrigation	Moderate	High
97	Moderate	Loose, pumice soils	Grass establishment and irrigation	Moderate	High
98	Moderate	Loose, pumice soils	Grass establishment and irrigation	Moderate	High
1A	Unsuited	Steep, rocky slopes	N/A	N/A	N/A
2A	Moderate	Coarse pumice soils, sparse ground cover	N/A	Low	Moderate
2B	Moderate to low	Coarse pumice soils, sparse ground cover	N/A	Low to moderate	High
4A	Moderate	Loose, dusty soils	Establish grass and irrigate	Moderate	High
4C	Unsuited	Erosion hazard	N/A	N/A	N/A
5A	Unsuited	Steep slopes, shallow depth to bedrock, loose soils	N/A	N/A	N/A
6A	Moderate	Loose, dusty soils; droughty	Establish grass and irrigate	Moderate	High
6B	Moderate	Loose, dusty soils; droughty	Establish grass and irrigate	Moderate	High
6C	Low	Droughty, lacks tree cover, erosive soils	N/A	Moderate	High
6E	Unsuited to moderate	High elevation, steep slopes, loose soils	N/A	Moderate to high	High
6G	Low to unsuited	Frost pockets, sparse ground cover, loose soils	Establish grass and irrigate	Moderate	High
6H	Moderate	Loose soils and sparse ground cover	N/A	Moderate to low	High
6J	Moderate	Loose, dusty soils	N/A	Moderate	High
7A	Low	Rough, rocky land: lava flows with very stony soils	Clear stones, add some fill	Low	Moderate to low
7B	Low	Uneven, rocky land with coarse pumice soils, high elevation	N/A	Low	Moderate to low
7C	Unsuited	Rough, rocky land with coarse pumice soils, droughty	N/A	N/A	N/A
7E	Moderate	Sparse ground cover, dusty soils	N/A	Low to moderate	High to moderate
7F	Low	High elevations, some steep slope, loose soils	N/A	Moderate	High to moderate
7G	Unsuited to low	Coarse pumice soils, steep slopes, high elevations	N/A	Moderate	Moderate
7H	Unsuited	Steep slopes and erosive soils	N/A	N/A	N/A
7J	Low	Coarse pumice soils; cold, droughty sites	N/A	Moderate	Moderate to high
7K	Unsuited	Steep slopes, erosive soils	N/A	N/A	N/A
7T	Unsuited	Lack of vegetation, exposed sites, stony soils	N/A	N/A	N/A
8A	Unsuited	Steep slopes, pumice soils	N/A	N/A	N/A
8B	Moderate to low	High elevation, some steep slopes, loose soils	N/A	Moderate	High to moderate
8C	Unsuited	Steep slopes, exposed aspect	N/A	N/A	N/A

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INTERPRETATIONS FOR RECREATION

Land-type No.	Susceptibility to Muddiness	Trail Suitability	Limitations for Trails	Considerations for Trail Improvements and Protection	Suitability for Sewage Filter Field	Soil Limitations to Sewage Filter Field Use
96	Low	High to moderate	Loose, dusty soils	Surfacing	Well to moderate	Depth to watertable in some spots
97	Low	High to moderate	Loose, pumice soils	Waterbars	Well	N/A
98	Low	High to moderate	Loose, pumice soils	Waterbars	Well	N/A
1A	N/A	Unsuited to low	Steep, rocky slopes	N/A	Unsuited	Steep rocky slopes, depth to bedrock
2A	Low	High	Coarse pumice soils	N/A	Moderate	Compact glacial till layer
2B	Low	Moderate	Loose, pumice soils	Waterbars	Moderate	Compact subsoil in some places
4A	Low	Moderate	Dustiness and erodability	Waterbars	Well	N/A
4C	N/A	Low	Erosion hazard	Provide adequate drainage facilities	Unsuited to poor	Erosion hazard and periodic washing
5A	N/A	Low to unsuited	Steep slopes, loose soils	Retaining wall, waterbars, contour on the slope	Unsuited	Steep slopes and depth to bedrock
6A	Low	Moderate	Loose, dusty soils	Surfacing, waterbars	Moderate	Depth to bedrock
6B	Low	Moderate	Loose, dusty soils	Surfacing, waterbars	Moderate	Depth to bedrock
6C	Moderate (spring, fall, and winter)	Moderate	Erosive soils	Surfacing and waterbars	Poor	Depth to bedrock
6E	Low	Moderate	Some steep slopes, erosive soils	Waterbars	Moderate	Some steep slopes
6G	Low to moderate (water may accum. when area gets compacted)	Moderate	Dustiness and loose soils, puddling in wet season	Surfacing	Moderate	Insufficient slope, depth to bedrock
6H	Low	Moderate to high	Loose soils, erosion	Waterbars	Moderate	Depth to bedrock
6J	Low	Moderate to high	Loose, dusty soils	Surfacing, waterbars	Moderate	Depth to bedrock
7A	Low	Moderate to low	Very stony soils, uneven land	Clear or rearrange stones, surfacing	Poor	Stoniness, excessive drainage
7B	Low	Moderate to low	Very stony soils, uneven land	Clear or rearrange stones, surfacing	Poor	Stoniness, excessive drainage
7C	N/A	Low to moderate	Stoniness and loose pumice soils	N/A	Unsuited to poor	Depth to bedrock, excessive drainage
7E	Low	High to moderate	Loose, dusty soils	Waterbars	Moderate	Depth to bedrock
7F	Low	High to moderate	Loose, dusty soils	Waterbars	Moderate to poor	Depth to bedrock
7G	Low	Moderate to low	Steep slopes and loose soils	Contour on the slope	Unsuited to poor	Steep slopes, excessive drainage
7H	N/A	Moderate to low	Steep slopes	Waterbars, contour on the slope	Unsuited	Steep slopes, depth to bedrock
7J	Low	Moderate	Loose, pumice soils	N/A	Well	N/A
7K	N/A	Low	Steep slopes, erosive soils	Contour on the slope, waterbars, surfacing	Unsuited	Steep slopes, depth to bedrock
7T	N/A	Low	Stony soils, some steep slopes	Waterbars, clear stones	Unsuited to low	Depth to bedrock, steep slopes
8A	N/A	Low	Steep slopes	Contour on the slope, use waterbars	Unsuited	Steep slopes, depth to bedrock
8B	Low	Moderate	Pumice soils	Waterbars	Moderate	Depth to bedrock
8C	N/A	Low to unsuited	Steep slopes	N/A	Unsuited	Steep slopes

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Land-type No.	Landtype Suitability for Recreation Area Development	Landtype Limitations for Recreation Development	Treatment to Increase Suitability	Soil and Site Damage Susceptibility	Susceptibility to Dustiness
8E	Unsuited	Erosive soils, high elevations, steep slopes	N/A	N/A	N/A
8F	Unsuited	Steep slopes, coarse pumice soils	N/A	N/A	N/A
8T	Unsuited	Steep slopes, loose soils	N/A	N/A	N/A
9A	Unsuited	Steep slopes, loose soils	N/A	N/A	N/A
9B	Unsuited	Steep slopes, loose soils, high elevations	N/A	N/A	N/A
9C	Unsuited	Steep slopes, loose soils, exposed aspects	N/A	N/A	N/A
9F	Moderate	Loose, dusty soils: sensitive ground cover	Grass seeding and irrigation	Moderate	High
9G	Moderate to high	Loose, dusty soils	Grass seeding and irrigation	Moderate to low	High
9J	Unsuited	Steep slopes	N/A	N/A	N/A
9K	Low	High elevations, coarse pumice soils, some steep slopes	N/A	Moderate	High to moderate
9L	Moderate	Loose, dusty soils	Seed grasses and irrigate	Moderate	High
9M	Moderate to high	Loose, dusty soils	Establish grasses and irrigate	Moderate	High
9N	Unsuited	Steep slopes and loose, pumice soils	N/A	N/A	N/A
9P	Unsuited	Steep slopes and loose, pumice soils	N/A	N/A	N/A
9R	Unsuited	Steep slopes, loose soils, exposed sites	N/A	N/A	N/A
9S	Unsuited	Steep slopes, loose soils, exposed sites	N/A	N/A	N/A
9T	Unsuited	Steep slopes, loose soils	N/A	N/A	N/A
9U	Moderate to low	Coarse pumice soils, sparse ground cover, cold sites	N/A	Low to moderate	High
9V	Unsuited to low	Rough rocky land, coarse pumice soils	Stone clearing	Low	Moderate
9W	Moderate	High elevations, coarse pumice soils	N/A	Low to moderate	High to moderate
9X	Unsuited	Steep slopes	N/A	N/A	N/A
9Y	Low	High elevations, some steep slopes, coarse pumice soils	N/A	Moderate	Moderate
9Z	Unsuited	Steep slopes and loose, pumice soils	N/A	N/A	N/A

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Land-type No.	Susceptibility to Maldiness	Trail Suitability	Limitations for Trails	Considerations for Trail Improvements and Protection	Suitability for Sewage Filter Field	Soil Limitations to Sewage Filter Field Use
8E	N/A	Unsuited to low	Erosive soils, steep slopes	N/A	Unsuited	Steep slopes, erosive soils
8F	N/A	Unsuited to low	Steep slopes and loose soils	N/A	Unsuited	Steep slopes
8T	N/A	Unsuited to low	Steep slopes and loose soils	N/A	Unsuited	Steep slopes, depth to bedrock
9A	N/A	Low	Steep slopes and loose soils	Contour on the slope, waterbars, surfacing	Unsuited	Steep slopes
9B	N/A	Low	Steep slopes and loose soils	Contour on the slope, waterbars, surfacing	Unsuited	Steep slopes
9C	N/A	Low	Steep slopes and loose soils	Contour on the slope, waterbars, surfacing	Unsuited	Steep slopes
9F	Low	Moderate	Loose, dusty soils	Surfacing	Well	N/A
9G	Low	Moderate to high	Loose, dusty soils	Surfacing, waterbars	Well	N/A
9J	N/A	Low	Steep slopes and loose soils	Contour on the slope, waterbars, surfacing	Poor to unsuited	Steep slopes
9K	Low	Moderate to high	Coarse pumice soils	N/A	Well	N/A
9L	Low	Moderate to high	Dustiness	Surfacing	Well	N/A
9M	Low	High to moderate	Dustiness	Surfacing	Well	N/A
9N	N/A	Low to unsuited	Steep slopes and loose soils	Contour on the slope, waterbars	Unsuited	Steep slopes
9P	N/A	Low to unsuited	Steep slopes and loose soils	N/A	Unsuited	Steep slopes
9R	N/A	Unsuited to low	Steep slopes and loose soils	Contour on the slope, retaining walls, waterbars	Unsuited	Steep slopes
9S	N/A	Unsuited	Steep, moderately dissected slopes	N/A	Unsuited	Steep slopes
9T	N/A	Low to unsuited	Steep slopes	Contour on the slope, waterbars	Unsuited	Steep slopes
9U	Low	Moderate	Coarse pumice soils	N/A	Moderate to well	Excessive drainage
9V	Low	Low	Rough, rocky land	Stone clearing	Unsuited to poor	Stoniness, depth to bedrock
9W	Low	Moderate to high	Coarse pumice soils	N/A	Moderate to well	Excessive drainage
9X	N/A	Low	Steep slopes and loose soils	Contour on the slope, use waterbars	Unsuited	Steep slopes
9Y	Low	Moderate	Some steep slopes, pumice soils	Waterbars	Poor	Some steep slopes, subsurface water flow
9Z	N/A	Low	Steep slopes and loose soils	Contour on the slope, use waterbars	Unsuited to poor	Steep slopes

SOIL RESOURCE INVENTORY
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TABLE OF INTERPRETATIONS FOR RANGE MANAGEMENT

Land-type	Suitability for Range Management	Limitations for Domestic Livestock	Susceptibility to Soil Compaction	Susceptibility to Soil Displacement	Potential for Range Improvement Through Seeding & Fert.	Limitations to Range Seeding
1	Unsuited	Rocky land, sparse vegetation	N/A	N/A	N/A	Stoniness and lack of soil
2	Low	Variable landtype, some steep slopes	Moderate	Moderate	Moderate	Some steep slopes
3	Unsuited	Rocky, steep slopes, high elevation	N/A	N/A	N/A	Steep, rocky slopes, high elevation
4	Low	Coarse soils, high elevation, sparse vegetation	Moderate to low	Moderate	Low	Coarse soils, frost heaving, insufficient summer precipitation, low fertility
5	High to low	Wetness on some sites	Moderate	Low	High to low	Wetness on some sites
6	Unsuited	Steep slopes	Low	Moderate	Low	Steep slopes
7	Unsuited	Lack of vegetation, coarse soils	Low	Moderate	Low	Frost heaving, temperature extremes, coarse soils, droughty
8	Moderate to low	Some wet spots	Moderate	Low	Moderate	Some stony soils, periodic flooding
9	Unsuited	Steep slopes, cindery soils, lack of vegetation	Low	High	Unsuited	Steep slopes, cindery soils
10	Low	Steep slopes	Low	Moderate to high	Low	Steep slopes
11	Unsuited	Rough, rocky land	Low	Low	Unsuited	Rough, rocky land; very stony soils
12	Unsuited	Steep slopes, high elevation	Low	High to moderate	Low to unsuited	High elevations, steep slopes
13	Unsuited	Rocky land at high elevations, steep slopes	N/A	N/A	Unsuited	Steep, rocky slopes at high elevations
14	Unsuited to low	Steep rocky slopes, loose soils	Low	High	Low	Steep slopes
15	Unsuited	Lack of forage	Low to moderate	Low to moderate	Low	Frost heaving, temperature extremes
16	Low	High elevations, sparse forage	Moderate to low	Low to moderate	Low	Harsh climate, coarse soils
17	Low	Sparse forage	Moderate to low	Low to moderate	Moderate	Droughty soils, gophers
18	Unsuited	Steep slopes at high elevations	Low	High	Unsuited	Steep slopes
19	Low	Sparse forage	Low to moderate	Low to moderate	Moderate	Droughty soils, gophers
20	Low	High elevations, sparse forage, some steep slopes	Low	Low	Low	Coarse soils, some steep slopes
21	Unsuited to low	Steep slopes	Low	Moderate to high	Unsuited to low	Steep slopes
22	Unsuited to low	Steep slopes	Low	Moderate to high	Unsuited to low	Steep slopes
23	Unsuited	Steep slopes, loose soils	Low	High	Low	Steep slopes, loose soils
24	Unsuited to low	Steep slopes	Low	Moderate to high	Low	Steep slopes
25	Low	Steep slopes, pumice soils	Low to moderate	Moderate	Low	Steep slopes, course soils
26	Moderate	Erosion potential, some moderately steep slopes	Low to moderate	Moderate	Moderate	Coarse soils

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TABLE OF INTERPRETATIONS FOR RANGE MANAGEMENT

Land-type	Suitability for Range Management	Limitations for Domestic Livestock	Susceptibility to Soil Compaction	Susceptibility to Soil Displacement	Potential for Range Improvement Through Seeding & Fert.	Limitations to Range Seeding
27	Low to unsuited	Steep slopes	Low	Moderate	Low	Steep slopes
28	Low	Some steep slopes, uneven land	Low	Moderate	Low to moderate	Some steep slopes
29	Moderate to high	Sandy soils	Low	Low to moderate	Moderate to high	Sandy soils
30	Low	Wetness, mostly a timbered site	Low to moderate	Low	Low to moderate	Brush competition, wet spots, coarse, soils
31	Unsuited	Steep slopes, pumice soils, high elevation	Low	High	Unsuited	Steep slopes, coarse pumice soils
32	Moderate	Coarse textured soils	Low to moderate	Low to moderate	Moderate	Droughty conditions; brush invasion, especially by manzanita
33	Low	Cindery soils	Low	Low to moderate	Unsuited to low	Cindery soils
34	Unsuited	Cindery soils, steep slopes	Low	High	Unsuited	Steep slopes and cindery soils
35	Low to unsuited	Steep slopes	Low	High	Low	Steep slopes, coarse soils, droughty conditions
36	Moderate	Droughty sites	Low to moderate	Low to moderate	Moderate	Droughtiness
37	Moderate to high	Droughty	Low to moderate	Low to moderate	Moderate to high	Droughtiness
38	Unsuited to low	Steep slopes	Low	High	Low	Steep slopes; loose, coarse textured soils
39	Moderate	Droughtiness	Low to moderate	Low	Moderate	Droughtiness
40	Moderate	Wetness	Low to moderate	Low	Moderate	Wetness
41	Moderate to low	Droughty soils	Low to moderate	Low to moderate	Moderate	Droughtiness, coarse soils
42	Low	Coarse soils	Low	Low to moderate	Moderate	Coarse soils
43	Low to moderate	Wetness	Low	Low to moderate	Low to moderate	Wetness
44	High	No major limitations	Low to moderate	Low to moderate	High	Coarse soils
45	Moderate	Coarse, pumiceous soils	Low to moderate	Low to moderate	Moderate to low	Coarse soils, frost heaving, droughty
46	Low	Coarse, pumiceous soils	Low to moderate	Low to moderate	Low	Coarse soils, frost heaving, droughty
47	Moderate	Droughty	Low to moderate	Low to moderate	Moderate	Droughty, coarse soils
48	Moderate	Droughty	Moderate to low	Low	Moderate	Droughty
49	Unsuited to low	Steep slopes	Low	Moderate	Low to moderate	Steep slopes, droughty
50	Unsuited	Steep slopes, shallow soils	Low	Moderate	Low	Steep slopes; shallow, erosive soils, droughty
51	Low to unsuited	Steep slopes	Low	Moderate to high	Low to moderate	Steep slopes, exposed aspects
52	Low to unsuited	Steep slopes	Low	Moderate to high	Low	Steep slopes
53	Low	Shallow soils	Moderate	Low	Moderate	Droughty
54	Moderate	No major limitations	Moderate	Low to moderate	Moderate to high	No major limitations
55	Moderate	No major limitations	Moderate	Low to moderate	Moderate to high	Somewhat droughty
56	Low	Coarse soils, droughty	Low	Low to moderate	Low to moderate	Droughty, coarse soils
57	Unsuited	Steep slopes, coarse pumice soils	Low	High	Low	Steep slopes, coarse soils, droughty

SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

TABLE OF INTERPRETATIONS FOR RANGE MANAGEMENT

Land-type	Suitability for Range Management	Limitations for Domestic Livestock	Susceptibility to Soil Compaction	Susceptibility to Soil Displacement	Potential for Range Improvement Through Seeding & Fert.	Limitations to Range Seeding
58	Unsuited	Steep slopes, coarse pumice soils	Low	High	Low	Steep slopes, loose pumice soils
59	Unsuited	Steep slopes	Low	High	Low	Steep slopes, droughty
60	Moderate	No major limitations	Moderate to low	Low	Moderate	Droughtiness
61	Moderate to high	No major limitations	Low to moderate	Low	Moderate to high	Droughtiness
62	Moderate to high	No major limitations	Low to moderate	Low	Moderate to high	No major limitations
63	Moderate	No major limitations	Low to moderate	Low	Moderate	Course, pumiceous soils
64	Moderate	Coarse soils, some steep slopes	Low	Moderate	Moderate	Brush competition, droughtiness
65	Moderate to low	Some steep slopes, coarse soils	Low	Moderate	Moderate to low	Coarse soils
66	Moderate	No major limitations	Low	Moderate	Moderate	Coarse soils, droughtiness
67	Moderate	No major limitations	Low	Moderate	Moderate	Coarse soils
68	Unsuited	Steep slopes and coarse, pumiceous soils	Low	High	Low	Coarse soils, steep slopes, exposed aspects
69	Unsuited	Steep slopes and coarse, pumiceous soils	Low	High	Low	Steep slopes and coarse soils
70	Low to moderate	Coarse, pumiceous soils	Low to moderate	Low to moderate	Low	Frost heaving, coarse soils
71	Moderate	Moderately steep slopes	Low to moderate	Low	Moderate	Moderately steep slopes
72	Moderate	Coarse soils, droughty	Low to moderate	Low to moderate	Moderate	Droughtiness, some frost heaving, coarse soils
73	Low to moderate	Sparse forage	Low to moderate	Low to moderate	Low	Frost; coarse, pumiceous soils
74	Unsuited	Rough, rocky land	Low	Low	Low	Very stony soils
75	Unsuited to low	Rough, rocky land	Low	Low	Low	Very stony soils, uneven lands, droughty
76	Unsuited	Rough, rocky land	Low	Low	Low	Very stony soils, uneven lands
77	Unsuited to low	Rough, rocky land	Low	Low	Low	Very stony soils, uneven land
78	Unsuited to low	Steep slopes	Low	Moderate	Low	Steep slopes
79	Unsuited to low	Steep slopes	Low	Moderate	Low	Steep slopes
80	Unsuited to low	Steep slopes, droughty	Low	High	Low	Steep slopes, droughtiness
81	Unsuited	Steep slopes, coarse soils	Low	High	Low	Brush competition; steep slopes; droughty, loose soils
82	Unsuited	Steep slopes, coarse soils	Low	High	Low	Steep slopes; coarse, pumice soils
83	Unsuited	Steep slopes, short season	Low	High	Low	Steep slopes, coarse soils, high elevation
84	Unsuited	Steep slopes, short season, coarse soils	Low	High	Low	Steep slopes at high elevations
85	Low to unsuited	Short season, coarse pumice soils	Low	Moderate	Low	High elevations, coarse soils
86	Unsuited	Steep slopes	Low	High	Low	Steep slopes
87	Unsuited	Steep slopes	Low	High	Low	Steep slopes

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TABLE OF INTERPRETATIONS FOR RANGE MANAGEMENT

Land-type	Suitability for Range Management	Limitations for Domestic Livestock	Susceptibility to Soil Compaction	Susceptibility to Soil Displacement	Potential for Range Improvement Through Seeding & Fert.	Limitations to Range Seeding
88	Unsuited	Steep slopes	Low	High	Low	Steep slopes
89	Unsuited	Steep, rocky slopes	Low	High	Unsuited	Steep, rocky slopes
90	Moderate	No major limitations	Moderate	Moderate	Moderate	Some moderately steep slopes
91	Low	Steep slopes	Low	High to moderate	Moderate	Steep slopes, droughty
92	Low	Cindery soils	Low	Low to moderate	Low	Coarse, cindery soils
93	Unsuited	High elevations, cindery soils	Low	Low to moderate	Low	Frost; short season; coarse, cindery soils
94	Low	Sandy soils, short season	Low	Moderate to high	Low	Sandy soils, high elevation, short season
95	Low	Sandy soils	Low	Moderate to high	Low	Sandy soils, moderately steep slopes
96	Low to moderate	Coarse pumice soils	Low	Low to moderate	Low	Frost; droughty; coarse pumice soils
97	Moderate to low	Coarse pumice soils	Low	Moderate	Low	Coarse pumice soils
98	Moderate to low	Coarse pumice soils	Low	Moderate	Low	Coarse pumice soils
1A	Unsuited	Steep, rocky slopes at high elevations	Low	Moderate to high	Low to unsuited	Coarse pumice soils at high elevations
2A	Low	Coarse pumice soils, short seasons	Low	Low to moderate	Low to unsuited	Coarse pumice soils at high elevations
2B	Low	High elevation, coarse pumice soils	Low to moderate	Low to moderate	Low	Coarse pumice soils
4A	Low	Coarse soils, high elevation, droughty	Low	Low to moderate	Low	Coarse, droughty soils
4G	Low	Erodible soils, droughty	Moderate	Moderate	Moderate	Erodible soils, drainage dissections, droughtiness
5A	Unsuited	Steep slopes, coarse soils, high elevations	Low	High	Unsuited	Steep slopes, coarse soils
6A	Moderate	No major limitations	Moderate to low	Low to moderate	Moderate	Droughtiness
6B	Moderate to low	Coarse soils, sparse forage	Low	Moderate	Moderate	Coarse, pumiceous soils; droughtiness
6C	Moderate to low	Droughty	Moderate	Low	Moderate	Droughtiness
6E	Low	Steep slopes, high elevations, coarse soils	Low	Moderate to high	Low	Coarse pumice soils at high elevations, some steep slopes
6G	Low to moderate	Frost pockets, coarse soils	Moderate	Moderate to low	Moderate	Frost; coarse, pumiceous soils
6H	Low	Coarse pumiceous soils	Low	Low to moderate	Low to moderate	Relatively high elevations, coarse soil
6J	Moderate	Coarse pumiceous soils	Low	Low to moderate	Moderate	Coarse, pumiceous soils
7A	Unsuited	Rough, rocky land at high elevations	Low	Low	Unsuited	Rough, rocky land; harsh climate
7B	Unsuited	Rough, rocky at high elevations; coarse pumice surface	Low	Moderate	Unsuited	Uneven land, very stony soils, coarse pumice, high elevations
7C	Unsuited	Rough, rocky land; coarse pumice soils	Low	High	Unsuited	Uneven land, very stony coarse pumice surface, droughty
7E	Unsuited to low	High elevation, sparse forage, some steep slopes, coarse soils	Low	Moderate	Low	Cold sites, coarse soils, some steep slopes

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TABLE OF INTERPRETATIONS FOR RANGE MANAGEMENT

Land-type	Suitability for Range Management	Limitations for Domestic Livestock	Susceptibility to Soil Compaction	Susceptibility to Soil Displacement	Potential for Range Improvement Through Seeding & Fert.	Limitations to Range Seeding
7F	Low to unsuited	High elevations, coarse soils, sparse forage, some steep slopes	Low	Moderate	Low	Harsh climate and coarse soils
7G	Unsuited	Steep slope, very coarse pumice soils, high elevation	Low	High	Unsuited	Very coarse pumice soils, steep slopes
7H	Low to unsuited	Steep slopes	Low	High	Low	Steep slopes, erosive soils, droughty
7J	Low	Coarse pumice soils, sparse forage	Low	Low to moderate	Low	Frost, coarse pumice soils
7K	Low to unsuited	Steep slopes	Low	Moderate to high	Low	Steep slopes
7T	Low	Steep slopes, stony soils	Low	Moderate	Low to moderate	Harsh climate, stony soils, steep slopes
8A	Unsuited	Steep slopes at high elevations	Low	High	Unsuited	Steep slopes and coarse pumiceous soils
8B	Low	Coarse soils at high elevations	Low	Moderate	Low	Coarse soils, short season
8C	Unsuited	Steep slopes	Low	High	Unsuited	Steep slopes, high elevation, coarse soils
8E	Unsuited	Very erosive soils, steep slopes	Low	High	Unsuited	Harsh climate, steep slopes, coarse pumice soils
8F	Unsuited	Steep slopes, coarse pumice	Low	High	Unsuited	Steep slopes, coarse soils, harsh climate
8T	Unsuited	Steep slopes	Low	High	Unsuited to low	Steep slopes, coarse soils
9A	Unsuited	Steep slopes	Low	High	Unsuited to low	Steep slopes, coarse pumice soils
9B	Unsuited	Steep slopes	Low	High	Unsuited	Steep slopes, coarse soils, harsh climate
9C	Unsuited	Steep slopes	Low	High	Unsuited	Steep slopes, coarse pumice soils
9F	Low	Coarse soils, sparse forage	Low to moderate	Low to moderate	Low	Coarse pumice soils, frost, droughtiness
9G	Low	Coarse pumice soils, some steep	Low	Moderate	Low	Coarse pumice soils
9J	Unsuited	Steep slopes	Low	High	Low	Steep slopes and coarse pumice soils
9K	Unsuited to low	Short season, coarse pumice soils	Low	Moderate	Low	Coarse pumice soils, harsh climate
9L	Low	Coarse pumice soils	Low	Moderate	Low	Coarse pumice soils
9M	Low	Coarse pumice soils, some steep slopes	Low	Moderate	Low	Coarse pumice soils
9N	Unsuited	Steep slopes, coarse pumice soils	Low	High	Unsuited	Steep slopes and coarse pumice soils
9P	Unsuited	Steep slopes, coarse pumice soils	Low	High	Unsuited	Steep slopes, and loose soils
9R	Unsuited	Steep slopes, coarse pumice soils	Low	High	Unsuited	Steep slopes and coarse soils
9S	Unsuited	Steep slopes, coarse pumice soils	Low	High	Unsuited	Steep slopes and coarse pumice soils
9T	Unsuited	Steep slopes	Low	High	Unsuited	Steep slopes and coarse pumice soils
9U	Low	Coarse pumice soils, sparse forage	Low	Moderate	Low	Coarse pumice soils, climatic conditions

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TABLE OF INTERPRETATIONS FOR RANGE MANAGEMENT

Land-type	Suitability for Range Management	Limitations for Domestic Livestock	Susceptibility to Soil Compaction	Susceptibility to Soil Displacement	Potential for Range Improvement Through Seeding & Fert.	Limitations to Range Seeding
9T	Unsuited	Steep slopes	Low	High	Unsuited	Steep slopes and coarse pumice soils
9U	Low	Coarse pumice soils, sparse forage	Low	Moderate	Low	Coarse pumice soils, climatic conditions
9V	Unsuited	Rough, rocky land	Low	Moderate	Unsuited	Rough, rocky land; coarse pumice soils
9W	Low	Coarse pumice soils, short season, sparse forage	Low	Moderate	Unsuited to low	Harsh climate, coarse pumice soils
9X	Unsuited	Steep slopes	Low	High	Unsuited	Steep slopes and coarse pumice soils
9Y	Unsuited to low	Coarse pumice soils, some steep slopes, high elevation	Low	Moderate	Unsuited to low	Coarse pumice soils, harsh climate
9Z	Unsuited	Steep slopes	Low	High	Unsuited	Steep slopes and coarse pumice soils

SOIL RESOURCE INVENTORY
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SOIL TEST RESULTS - CHEMICAL ANALYSIS 1/

Land-type No.	Location	Depth (inches)	pH	P (ppm)	Extractable Cations K (ppm)	K (meq/100g)	Ca (meq/100g)	Mg (meq/100g)	Total Bases (meq/100g)	Soluble Salts (mmhos/cm)	O.M. %	SO_4-S ppm	T.N. %
22	NW¼, NE¼, S2, T14S, R8E	0-3	6.2	29	198	.50	8.3	1.5	10.30	.4	6.8	1.6	.16
22	" "	12-18	6.8	7	76	.19	3.8	.69	4.68	.1	1.9	0.6	.05
22	" "	38-43	7.2	3	124	.32	4.7	1.1	6.12	.0	1.8	0.4	.04
32	SW¼, S11, T16S, R9E	0-6	6.4	14	330	.84	4.7	.89	6.93	.3	3.4	0.9	.06
32	" "	18-22	7.1	10	564	1.44	4.2	1.5	7.14	.1	.93	0.1	.02
33	SW¼, SW¼, S30, T13S, R9E	0-12	5.9	15	72	.18	1.8	.20	2.18	.3	7.5	1.5	.08
33	" "	18-28	6.9	3	36	.09	1.5	.36	1.95	.0	.82	0.1	.02
37	NW¼, SW¼, S23, T14S, R9E	1-8	6.7	7	216	.55	3.4	.99	4.94	.15	1.8	0.1	.04
37	" "	18-24	7.3	2	330	.84	4.3	2.0	7.14	.1	.61	0.1	.02
37	" "	40-44	7.3	4	614	1.57	7.1	3.6	12.27	.15	.61	0.1	.01
50	SE¼, NW¼, S4, T12S, R11E	2-8	7.5	17	760	1.9	11.8	5.1	18.80	.15	1.9	0.6	.06
51	SE¼, NW¼, S14, T12S, R10E	0-6	7.2	15	476	1.21	10.4	4.8	16.41	.2	1.8	1.0	.04
51	" "	10-18	6.9	18	292	.74	10.6	6.9	18.24	.1	1.3	0.9	.03
51	" "	20-24	6.9	4	186	.47	7.5	5.3	13.27	.15	.66	0.8	.01
52	SW¼, NW¼, S23, T12S, R10E	0-6	7.1	38	720	1.8	8.3	3.2	13.30	.15	1.6	0.4	.04
52	" "	12-20	7.1	14	760	1.9	12.4	7.3	21.60	.1	1.0	0.3	.03
52	" "	21-29	7.2	5	720	1.8	11.2	8.9	21.90	.15	.61	0.4	.02
53	NE¼, NE¼, S2, T12S, R10E	0-6	6.6	5	116	.30	5.5	2.5	8.30	.1	1.5	0.7	.06
61	NW¼, NE¼, S24, T12S, R9E	0-12	6.9	7	558	1.42	5.5	4.2	11.12	.1	.56	0.3	.02
61	" "	16-24	7.1	8	298	.76	4.0	1.1	5.86	.1	1.4	0.1	.03
62	SE¼, NW¼, S30, T12S, R10E	0-6	6.7	12	636	1.62	7.2	2.0	10.82	.3	2.7	0.4	.06
62	" "	14-22	7.1	8	840	2.1	8.3	3.5	13.90	.1	1.2	0.1	.03
64	SE¼, SE¼, S20, T20S, R8E	0-3	6.2	13	198	.50	3.2	.36	4.06	.1	1.1	0.8	.12
64	" "	4-10	7.0	12	186	.47	2.4	.59	3.46	.1	1.5	0.1	.03
64	" "	12-20	6.8	5	156	.40	2.1	.46	2.96	.0	.72	0.1	.01
64	" "	30-33	7.0	7	304	.78	3.0	1.3	5.08	.1	.40	0.1	.01
70	NW¼, NW¼, S15, T23S, R11E	0-3	5.6	12	170	.43	3.0	.36	3.79	.3	8.3	1.7	.16
70	" "	5-12	6.4	4	84	.21	1.0	.20	1.41	.1	1.1	0.1	.03
70	" "	17-25	6.6	5	60	.15	1.3	.30	1.75	.1	.56	0.1	.004
70	" "	30-36	6.5	1	54	.14	.7	.20	1.04	.0	.45	0.3	.001
78	NE¼, NE¼, S18, T12S, R10E	0-12	7.1	11	286	.73	3.4	1.1	5.23	.1	.77	0.4	.02
78	" "	24-30	7.1	48	464	1.18	7.2	3.3	11.68	.1	.72	0.1	.02
95	SE¼, SE¼, S33, T13S, R8E	2-15	6.4	6	36	.09	.9	.25	1.24	.1	2.7	1.4	.05
95	" "	26-36	6.8	5	20	.05	.9	.25	1.20	.0	.19	0.4	.01
96	SE¼, SE¼, S4, T24S, R9E	0-2	5.8	6	112	.29	2.7	.30	3.29	.4	10.4	2.4	.08
96	" "	4-8	6.5	6	64	.16	1.0	.16	1.32	.1	1.9	0.1	.03
96	" "	16-22	6.5	2	32	.08	.9	.16	1.14	.1	.50	0.3	.002
96	" "	36-42	6.6	2	76	.19	1.2	.25	1.64	.0	.19	0.1	.001
96	" "	52-58	6.8	5	268	.68	2.9	1.7	5.28	.1	.08	0.1	.01
6A	SE¼, NE¼, S36 T23S, R13E	0-3	6.2	68	544	1.39	5.5	1.3	8.19	.15	5.3	1.0	.10
6A	" "	4-11	6.5	20	380	.97	2.3	.76	4.03	.1	1.9	0.3	.04
6A	" "	13-20	6.6	11	358	.91	3.4	.69	5.00	.1	.77	0.1	.02
9L	SE¼, SE¼, S36, T26S, R7E	0-2	5.8	8	100	.26	2.1	.25	3.21	.4	6.8	2.2	.09
9L	" "	4-16	6.9	6	76	.19	1.2	.30	1.69	.1	1.6	1.0	.02
9L	" "	24-30	6.7	4	48	.12	1.0	.16	1.28	.1	.88	0.6	.004
9Z	NW¼, NW¼, S24, T24S, R7E	0-3	6.3	9	116	.30	1.6	.20	2.10	.15	6.2	1.1	.07
9Z	" "	6-12	6.7	12	88	.22	1.6	.20	2.02	.1	3.0	1.1	.03
9Z	" "	14-18	6.6	4	54	.14	.6	.25	.99	.1	1.4	0.1	.01
9Z	" "	30-36	6.7	2	36	.09	.4	.10	.59	.1	.61	0.1	.001
9Z	" "	66-70	6.7	4	760	1.9	6.2	1.1	9.20	.1	.82	0.1	.02

1/ Tests were conducted at Oregon State University, Soil Testing Laboratory, Corvallis, Oregon. May 15, 1975.

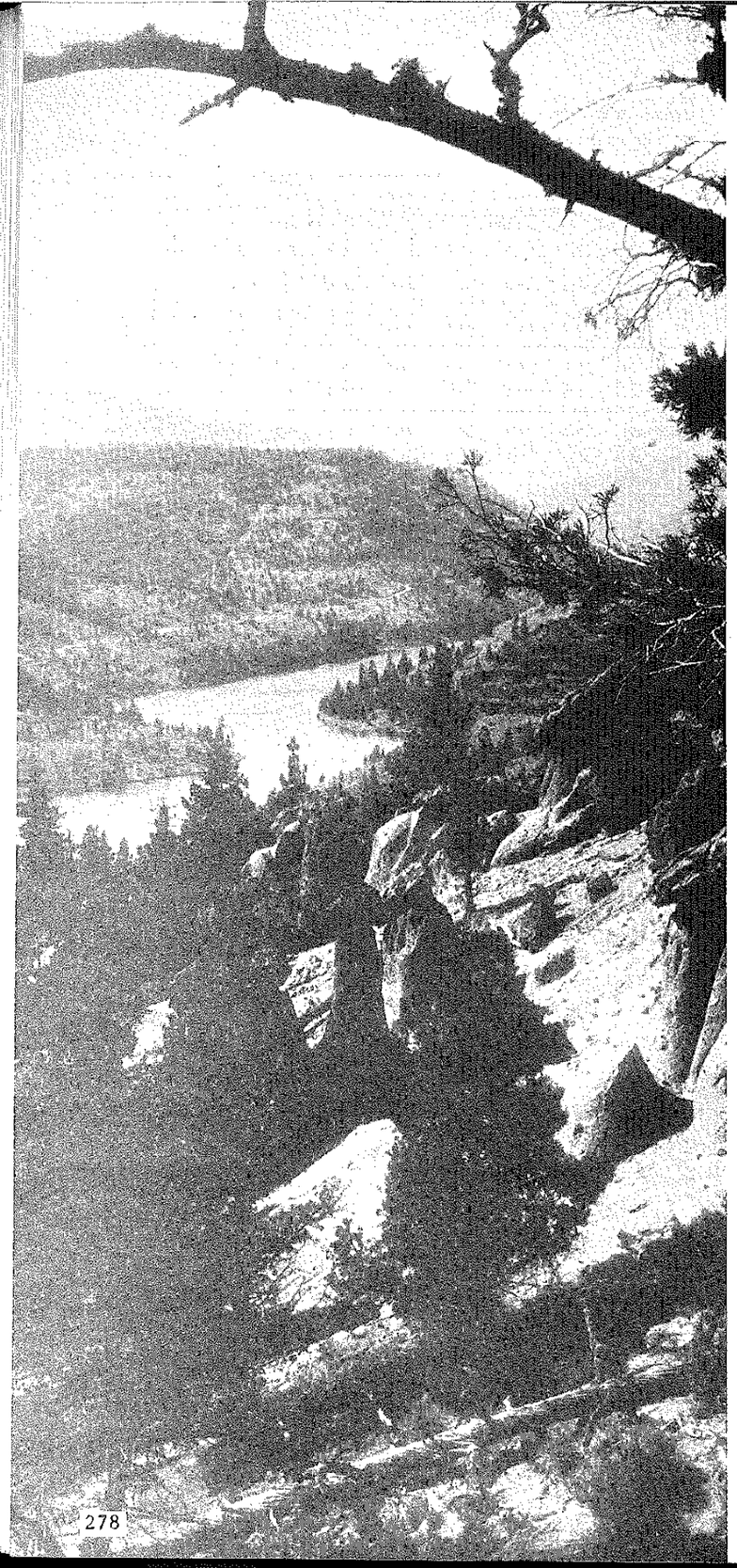
SOIL RESOURCE INVENTORY
DESCHUTES NATIONAL FOREST

SOIL MOISTURE ANALYSIS

Land-type No.	Sample and Depth	Location	Bulk Density	% Coarse Fragments	% Soil Moisture - By Weight 1/ 0.1 bar	0.3 bar	15 bars	% Soil Moisture - By Volume 0.1 bar	0.3 bar	15 bars	Retention (0.3-15 bars)	Detention (0.1-0.3 bar)	Available Water (In/Ft) 0.3-15 bars	0.1-15 bars
22	10-30" Ash Layer	NW¼, S14, T13S, R8E	1.08	2	27.1	17.8	7.9	29.3	19.2	8.5	10.7	10.1	1.26	2.45
22	0-32" Mixed Ash and Glacial Till	SE¼, NW¼, S25, T12S, R8E	1.17	40	35.6	25.0	15.8	41.7	29.3	18.5	10.8	12.4	0.77	1.67
22	32-50" Weathered Till	" "	1.78	50	33.4	27.6	17.3	59.5	49.5	30.8	18.7	10.0	1.12	1.73
22	50-60" Grey, Compact Glacial Till	" "	1.63	60	11.9	9.8	6.3	19.4	16.0	10.3	5.7	3.4	0.77	0.43
33	0-20" Weathered Cinders	SE¼, NE¼, S26, T13S, R8E	0.98	*	9.5	7.4	4.5	9.3	7.3	4.4	2.9	2.0	0.35	0.59
33	45-56" Unweathered Cinders	" "	1.12	*	7.3	5.5	2.1	8.2	6.2	2.4	3.8	2.0	0.46	0.70
37	0-20" Ash Layer	NW¼, SW¼, S23, T14S, R9E	1.20	15	32.6	23.0	14.4	39.1	27.6	17.3	10.3	11.5	1.05	2.22
37	20-40" Mixed Ash & Buried Soil	" "	1.29	25	34.8	25.7	11.9	44.9	33.9	15.4	18.4	11.0	1.54	2.65
37	40-64" Gravelly Outwash	" "	1.50	75	34.0	29.0	19.6	51.0	43.5	29.4	14.1	7.5	0.42	0.65
52	20-30" Residual Soil On Tuffs	SW¼, NW¼, S20, T12S, R10E	1.01	20	33.8	30.4	17.8	34.1	30.7	18.0	12.7	3.4	1.22	1.55
60	3-8" Mixed Ash & Residual Soil	NW¼, NE¼, S12, T12S, R10E	1.09	7	27.3	22.9	11.1	29.8	25.0	12.1	12.9	4.8	1.44	1.98
61	3-15" Mixed Ash & Residual Soil	NE¼, NE¼, S24, T13S, R9E	1.30	20	24.5	16.1	7.5	30.6	20.9	9.8	11.1	9.7	1.06	1.99
61	15-25" Residual Soil	" "	1.34	20	22.0	19.2	11.3	29.5	25.7	15.1	10.6	3.8	1.02	1.38
62	0-9" Ash Layer	NW¼, SE¼, S1, T12S, R10E	0.93	10	38.9	30.6	16.7	36.2	28.5	15.5	13.0	7.7	1.40	2.23
62	9-20" Mixed Ash & Residual Soil	" "	1.08	20	39.2	32.6	19.7	42.3	35.2	21.3	13.9	7.1	1.32	2.02
6B	3-10" Pumice Soil-AC	NE¼, NE¼, S9, T23S, R11E	0.64	*	40.8	30.4	11.6	26.1	19.5	7.4	12.1	6.6	1.45	2.74
6B	10-30" Pumice Soil-C1	" "	0.40	*	27.0	21.7	9.9	10.8	8.7	4.0	4.7	2.1	0.56	0.82
6B	30-45" Buried Soil	" "	1.36	5	20.1	16.0	8.5	27.3	21.8	11.6	10.2	5.5	1.16	1.79
95	0-70" Black Sand Soil	NW¼, NE¼, S32, T13S, R8½E	1.12	0	17.6	9.8	6.0	19.7	11.0	6.7	4.3	8.7	0.52	1.56
96	0-10" Pumice Soil-A1 and AC	SE¼, SW¼, S4, T24S, R9E	0.86	*	54.0	33.8	16.5	46.4	29.1	14.2	14.9	17.3	1.79	3.87
96	10-30" Pumice Soil-C1	" "	0.44	*	67.0	37.8	16.7	29.5	16.6	7.3	9.3	12.9	1.12	2.66
96	30-55" Pumice Soil-C2	" "	0.64	*	24.2	23.5	8.8	15.5	15.0	5.6	9.4	0.5	1.13	1.19
96	55-67" Buried Soil	" "	1.64	30	18.1	16.3	10.0	29.7	26.7	16.4	10.3	3.0	0.87	1.12
9L	15-36" Pumice Soil-C1	SE¼, SE¼, S36, T26S, R7E	0.60	*	80.7	68.0	28.6	48.4	40.8	17.5	23.3	7.6	2.80	3.71
9L	36-60" Pumice Soil-C2	" "	0.61	*	43.8	34.1	19.1	26.3	20.8	11.7	9.1	5.4	1.09	1.75
9Z	5-10" Pumice Soil-AC	NW¼, NW¼, S24, T24S, R7E	0.64	*	44.5	26.5	10.2	27.8	17.0	6.5	10.5	10.8	1.26	2.56
9Z	10-30" Pumice Soil-C1	" "	0.51	*	56.8	35.8	16.8	29.0	18.3	8.6	9.7	10.7	1.17	2.45
9Z	30-55" Pumice Soil-C2	" "	0.57	*	42.4	20.7	11.2	24.7	11.8	6.4	5.4	12.9	0.65	2.20
9Z	55-70" Buried Soil	" "	1.44	30	25.9	21.3	18.2	36.3	30.7	26.2	4.5	5.6	0.27	0.61

1/ Determined by U.S. Forest Service Hydrology Laboratory, Wenatchee, Washington.

* Coarse fragments were included in the sample for testing on pumice and cinder soils.



IX APPENDICES

IX APPENDICES

APPENDIX A[1/]
GEOLOGY AND PHYSIOGRAPHY

INTRODUCTION

The area of the Deschutes National Forest is a geologically young and complex volcanic region of mostly Pleistocene age that lies on the east flank of the Cascade Range and on the large and complex shield volcano, Newberry Volcano. The great variety of volcanic landforms, volcanic rock, and glacial landforms found in Deschutes National Forest is probably unique in the United States (see Figures 11 and 12). Spectacular stratovolcanoes, some deeply eroded by glaciers, line the Cascade crest and cover much of the east flank. About 420 basalt cinder cones dot the landscape, with half of these resting on the slopes of Newberry Volcano. Lakes and rivers have been formed or moved by glacial and volcanic activity.

Unlike the west flank of the Cascade Range, deposition has generally exceeded erosion, creating a landscape with few deep, steep-sided valleys and canyons. Instead, most landforms are positive, constructed volcanic features with flat or gently sloping fields of lava, sediments, or glacial debris lying between. Glaciers, however, have extensively carved the volcanic pile that forms the Cascade crest, leaving eroded remnants of volcanoes, a few deep glacial valleys, and great blankets and ridges of boulders and gravel. From glacial meltwater, extensive sheets of sand and gravel were deposited at lower elevations.

PHYSIOGRAPHY

Most land on the Deschutes National Forest lies between 3,000 and 6,000 feet elevation, with a minimum elevation of 1,940 at Lake Billy Chinook at the north end of the Forest, and a maximum of 10,358 feet at the top of the stratovolcano, South Sister. All surface water drains to the north and travels to the Columbia River in the Deschutes River.

In the most general description, Deschutes National Forest lies on the east flank of the Cascade Range, forming a strip 16 to 20 miles wide and 100 miles long. The strip is modified by the addition to the east of the area of Newberry Volcano, the top of which is 37 miles east of the Cascade crest.

Deschutes National Forest can, however, be conveniently divided into 9 physiographic areas (Figure 12). Each corresponds to distinct topographic and geologic areas:

1/ This Appendix was prepared by L. A. Chitwood, Geologist, Deschutes National Forest.

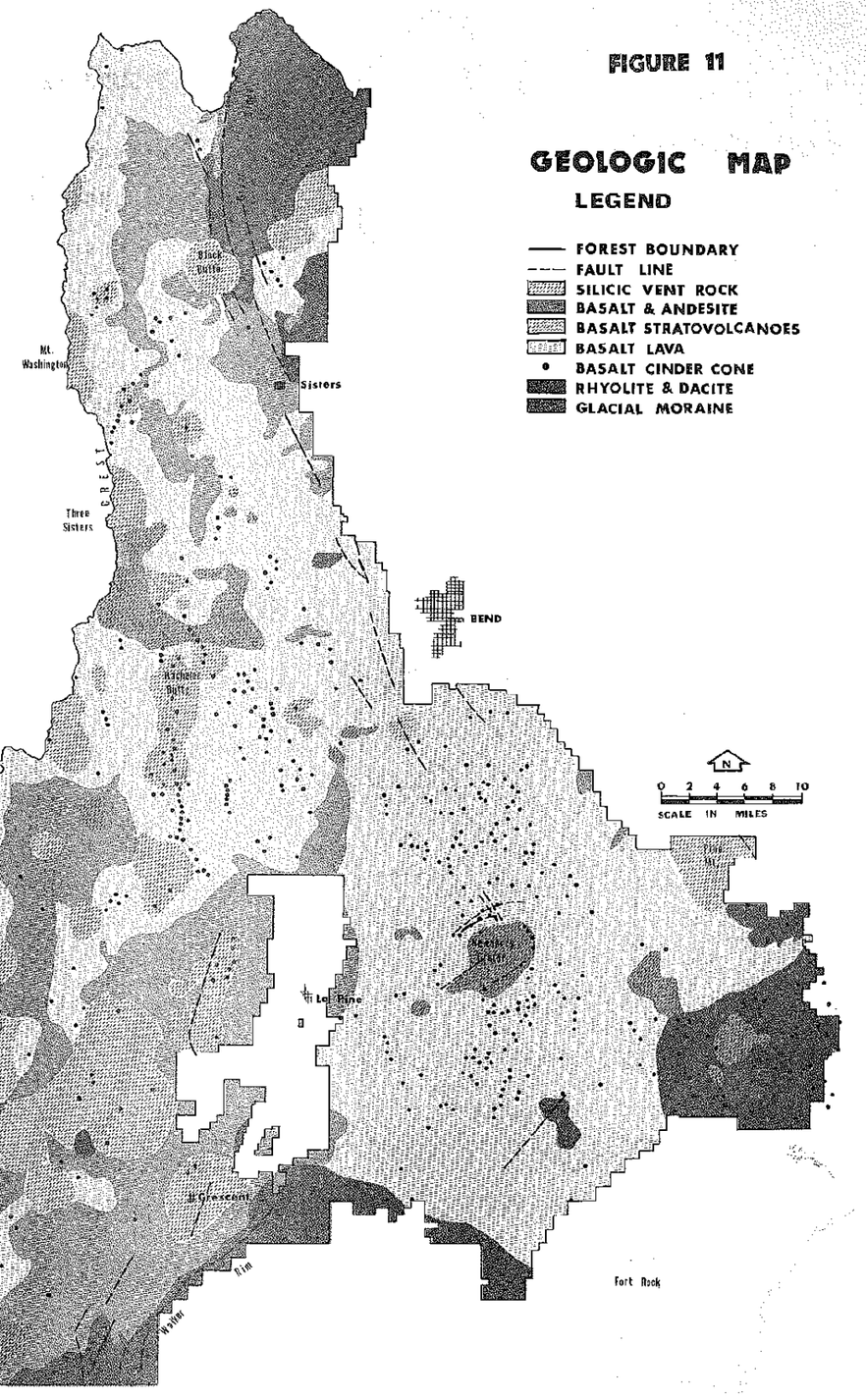


FIGURE 11

GEOLOGIC MAP

LEGEND

- FOREST BOUNDARY
- FAULT LINE
- SILICIC VENT ROCK
- BASALT & ANDESITE
- BASALT STRATOVOLCANOES
- BASALT LAVA
- BASALT CINDER CONE
- RHYOLITE & DACITE
- GLACIAL MORAINE

DESCHUTES NATIONAL FOREST

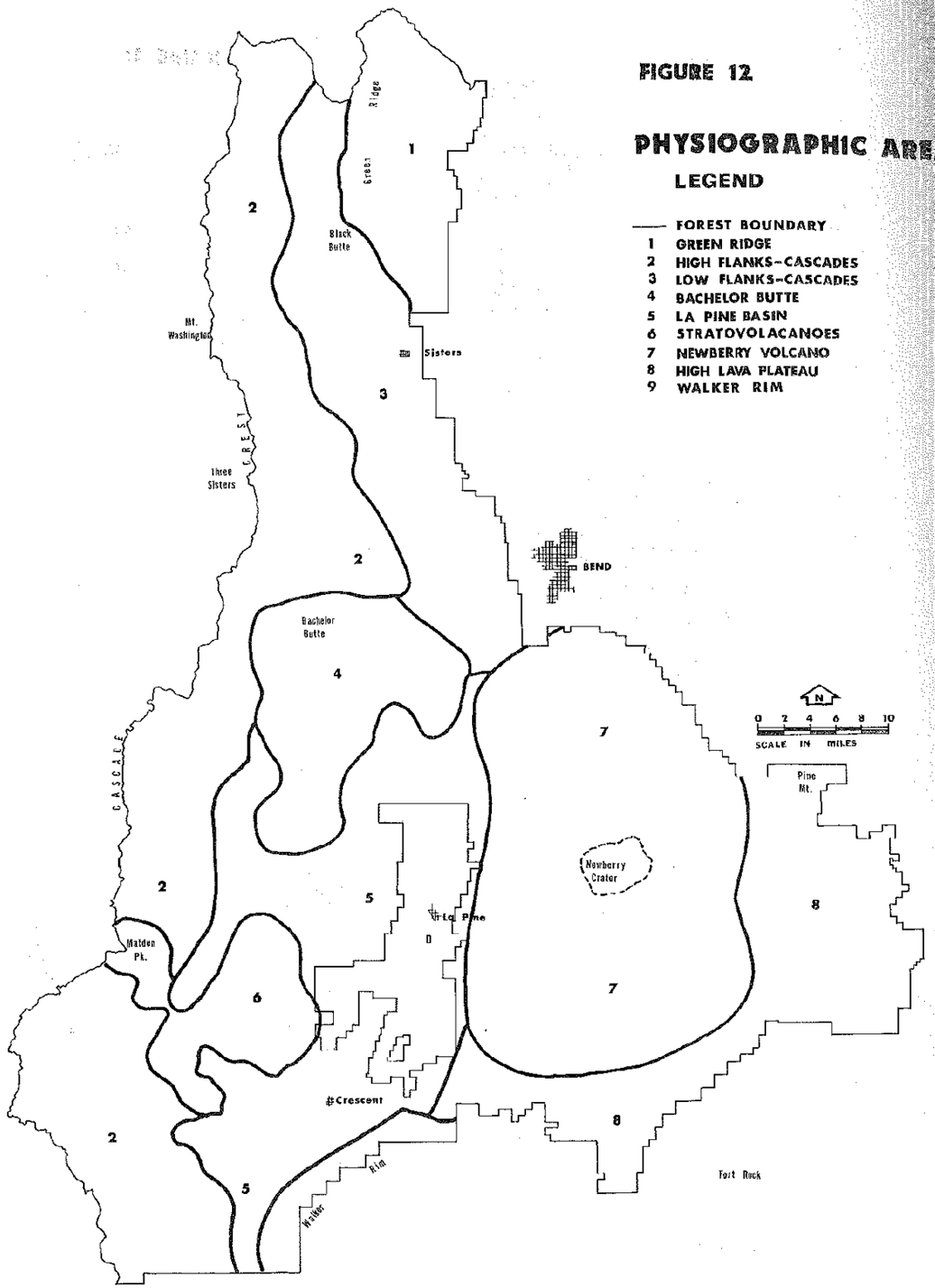


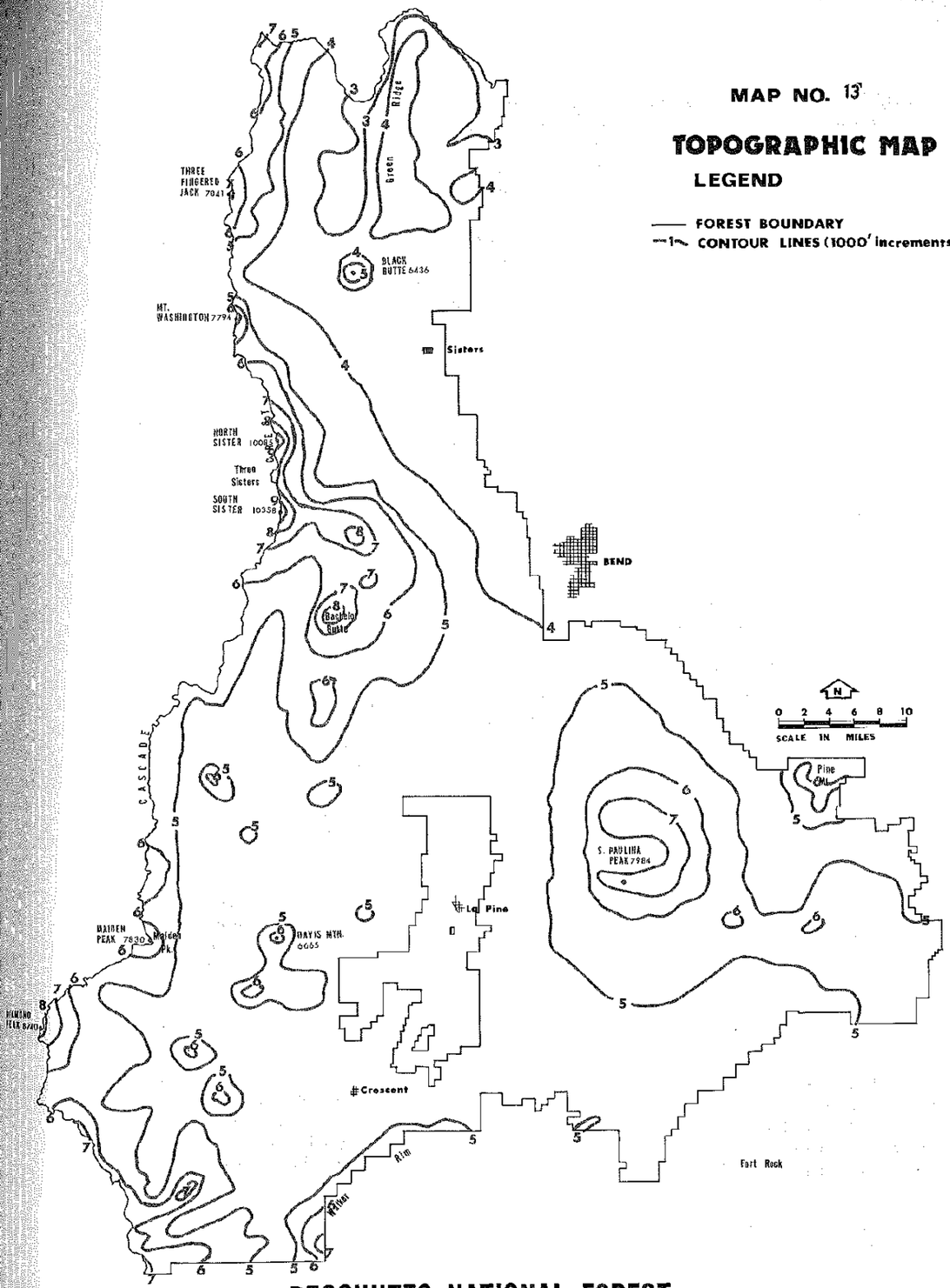
FIGURE 12

PHYSIOGRAPHIC AREAS

LEGEND

—— FOREST BOUNDARY
1 GREEN RIDGE
2 HIGH FLANKS-CASCADES
3 LOW FLANKS-CASCADES
4 BACHELOR BUTTE
5 LA PINE BASIN
6 STRATOVOLACANOES
7 NEWBERRY VOLCANO
8 HIGH LAVA PLATEAU
9 WALKER RIM

DESCHUTES NATIONAL FOREST



MAP NO. 13

TOPOGRAPHIC MAP

LEGEND

—— FOREST BOUNDARY
—1— CONTOUR LINES (1000' increments)

DESCHUTES NATIONAL FOREST

High Flank of the Cascades - This rugged and scenic area is dominated by glacial landforms. Stratovolcanoes that line the crest have been deeply eroded by glaciers. Glacial ice has periodically covered this area in continuous enormous sheets. Horns, cirques, moraines, deep glacial valleys, kettle lakes, and other glacial landforms abound.

Low Flanks of the Cascades - Gentle slopes on lava fields and glacial outwash dotted with cinder cones, dacite domes, and a few stratovolcanoes characterize this area. Considerable local erosion and a few fault scarps add to the variety of a generally subdued topography.

LaPine Basin - This nearly flat area at 4,200 to 4,500 feet elevation is in a basin between the Cascade Range and Newberry Volcano that has filled with lake and stream deposits. Local topographic relief seldom exceeds 25 feet. The Deschutes River, Little Deschutes River, and other streams meander in shallow, wide flood channels. Along part of its course, however, the Deschutes River has cut a steep-walled channel 60 feet deep, and Crescent Creek to the south has cut 130 feet. A blanket of pumice from Mount Mazama (Crater Lake) covers the entire area to a depth of 10 feet at the south end, decreasing northward to one foot. The pumice has generally reduced the steepness of local slopes.

Newberry Volcano - The great Newberry shield volcano measures 20 by 30 miles and rises to 7,984 feet elevation above a base at 4,000 to 4,500 feet. A summit caldera, Newberry Crater, 5 miles in diameter, contains 2 lakes and a variety of very young volcanic landforms. The gentle slopes of the uneroded north and south lava-covered flanks are interrupted by nearly 200 cinder cones ranging from 50 to 500 feet in height. Air fall deposits of pumice and volcanic ash bury and provide a smooth surface on all but the youngest lava flows. Water, flowing in the past, has dissected the ash-flow deposits on the west and northeast flanks, leaving parallel ridges and valleys. Paulina Creek, the only present-day stream on the entire 500-square-mile volcano, flows westward in a small canyon to the Little Deschutes River. No glacial landforms are known.

High Lava Plateau - East and south of Newberry Volcano, landforms are typical of the High Lava Plateau geomorphic province of southeast Oregon (Dicken, 1965). Numerous dacite and rhyolite domes and cinder cones rise from a gently rolling surface of lava flows between 4,700 and 5,200 feet elevation. Large air fall deposits of pumice and volcanic ash and alluvium have greatly subdued local topography over large areas.

Bachelor Butte-Lookout Mountain Complex - A series of uneroded lava cones, cinder cones, and stratovolcanoes form a chain 15 miles long from Bachelor Butte to Lookout Mountain. Between this chain and the Cascade crest, the headwaters of the Deschutes River flow south before passing around the southern end of the chain to begin a northward journey to the Columbia River. East of the chain, an area included in the complex, are numerous cinder cones, lava fields, and tuff rings.

Stratovolcanoes - A group of stratovolcanoes nearly unmodified by glaciers or other erosional agents are clustered in the southwest part of the forest. They stand 2,000 feet high, measure 3 to 5 miles in diameter at their bases, and exhibit low, nearly straight-line profiles. The flanks of some overlap.

Green Ridge - A prominent, steep, west-facing fault scarp up to 2,000 feet high marks the western edge of a gently east-sloping Pliocene volcanic surface that is slightly eroded at the south end and moderately eroded at the north end. Two shield-like volcanoes, Squaw Back Ridge and Little Squaw Back, rise about 1,000 feet above the middle of the east-sloping surface. Green Ridge terminates to the north along a deep canyon cut by the Metolius River, a major tributary to the Deschutes River.

Walker Rim - Much like the Green Ridge area, the Walker Rim area features a prominent, steep, northwest-facing fault scarp, above which lies nearly flat land. Five to 10 feet of pumice from Mount Mazama (Crater Lake) have buried the entire area and subdued the local topographic relief on the scarp.

GEOLOGY

Basaltic and andesitic volcanism of Pliocene, Pleistocene, and Holocene age dominate the complex geologic history of Deschutes National Forest (Figure 11). Silicic volcanism is much less common but holds title to producing the oldest and youngest known rocks in the Forest (Pine Mountain, 21-million-years; and the Big Obsidian Flow, 1,300-years respectively). Great centers of volcanism lie along and near the High Cascade crest and at Newberry Volcano. The underlying reasons that would explain the location of these and smaller centers in the light of plate tectonic theory are poorly understood in this area.

Complex regional stresses have produced significant fault zones of normal faulting, particularly notable at Green Ridge and Walker Rim. Other faults have largely been buried by late Pleistocene and Holocene volcanism. In and near Deschutes National Forest, three major tectonic features are evident; they are the Brothers fault zone, the High Cascades lineament, and Newberry Volcano. These three features roughly define a triangular area lying within Deschutes National Forest where Quaternary volcanism has been concentrated.

The great volcanic piles of the High Cascades and Newberry Volcano are generally highly permeable. Most rain and meltwater flows into the subsurface and becomes part of an extraordinarily complex ground water system. Regional ground water probably lies at about 4,000 feet beneath Newberry Volcano and 2,000 to 3,000 feet beneath the rest of the Forest. All water wells on the Forest tap perched aquifers in a variety of volcanic environments. Large springs discharge from complex perched systems. Many are fault controlled. Water quality is high except in parts of the "LaPine Basin." The ground water resource is vast and largely undeveloped.

The following is a general description of geologic units shown in Figure 11 and starting with the oldest:

Silicic Vent Rocks of Pine Mountain - Pine Mountain is a large, complex, considerably eroded silicic dome composed predominantly of rhyolite and dacite vitrophyre. It also contains thick basalt flows on its northeast flanks. The lower flanks of the dome complex are buried in debris eroded from higher elevations. A K/Ar age date of 21-million-years has recently been determined by the U. S. Geological Survey (Norman MacLeod, Personal communication, 1976).

Basalt and Andesite Lava, Tuff, and Sedimentary Rocks - These rocks of principally middle to late Pliocene age consist of slightly altered thin to thick lava flows of vesicular to dense basalt and andesite. Many tuff units, both silicic and mafic, were deposited from ash-flows. Cemented and uncemented volcanic sediments and diatomite predominate, like tuffs, in local areas. Tuffs and sediments are typically considerably altered, particularly if fine-grained. The areas of Green Ridge, Walker Rim, and southeast of Newberry Volcano contain these rocks.

Basalt Stratovolcanoes and Other Mafic Vent Areas - Areas along the crest and east flanks of the Cascade Range are covered by large basalt and basaltic-andesite stratovolcanoes and smaller shield-like volcanoes of mostly Pleistocene age. These contain lava flows, scoria, breccia, ash, and dike and intrusive complexes. Many along the crest have been deeply eroded by glaciers, such as North Sister, while others have escaped significant erosion, such as Black Butte and Davis Mountain.

Basalt Lavas, Ash-Flow and Air Fall Deposits - Most of the land in Deschutes National Forest is covered and armored by unaltered basalt and basaltic-andesite lava flows of Pleistocene and Holocene age. Most of the Cascade Range and Newberry Volcano are built by these thin to thick, sometimes very extensive, olivine-bearing lavas. Flows are typically diktytaxitic and vesicular, blocky, or highly fluid. They frequently contain considerable flow breccia and scoria. Numerous lava tubes form in many pahoehoe flows, particularly on the flanks of Newberry Volcano.

In some areas, tuffs, pumice, and volcanic ash of Pleistocene age are common, such as the west and northeast flanks of Newberry Volcano and along the Forest boundary, a few miles west of Bend and Tumalo Reservoir.

Tuff rings and cones, such as those forming Wake, Sitkum, and Moffitt Buttes, are included, as well as maars, such as North and South Twin Lakes.

Basalt Cinder Cones - Cones and mounds of basalt and basaltic-andesite cinders, lapilli, bombs, and agglutinate of Pliocene to Holocene age account for about 420 of the hills 50 to 500 feet high, scattered over Deschutes National Forest. Concentrated numbers of the cones occur on the north and south flanks of Newberry Volcano and in the triangular area between Bachelor Butte, Lava Butte, and Lookout Mountain. Plume

deposits of volcanic ash blanket the areas downwind from the cones. These deposits may be several feet thick and can cover a few acres or several square miles. The plume deposit of Lava Butte exceeds 25 feet in thickness near the northeast base of the cone and covers 0.7 square miles.

Rhyolite and Dacite Flows and Domes - Domes and lava flows of rhyolite, dacite, and silicic andesite of Pliocene to Holocene age are scattered over the entire Forest, but occur mostly in and near Newberry Crater, the China Hat-Quartz Mountain area, and near Broken Top. Several Holocene obsidian flows are younger than 6,000 years, including Rock Mesa near South Sister, 2,300 years, and the Big Obsidian Flow in Newberry Crater, 1,300 years, the youngest dated volcanic material on the Forest. Large blankets of pumice that cover nearby areas were sometimes produced during eruption of these flows and domes.

Newberry Crater contains not only silicic rock but a wide variety of volcanic rock types and volcanic landforms.

Glacial Moraines and Outwash, Lake and River Deposits, and Alluvium - At least three times within the last 100,000 years, glacial ice has covered the Cascade Range in a continuous sheet. The retreat of each sheet left moraines that cover most of the high flanks of the Cascades. These moraines contain the eroded fragments of volcanoes and display a wide range of fragment sizes, from silt to enormous boulders. From glacial meltwater, sand and gravel were deposited in channels and in large outwash fans at lower elevations.

A large basin between Newberry Volcano and the Cascades has filled with lake and river deposits. Layered silt, sand, and diatomite are partly covered by an eroded veneer of sand and gravel from glacial meltwater. The veneer thickens and particle sizes increase near sources in the Cascades.

Alluvium has filled small basins and formed small fans east of Newberry Volcano. Other similar areas are scattered over the rest of the Forest. An impervious economic clay-like material fills a small basin north of Sisters called Edgar Lake.

Air Fall Deposits - Large areas lie buried under silicic air fall deposits of Holocene age. The best known and most extensive of these is the dacitic Mazama pumice, erupted from Mount Mazama (Crater Lake) 6,600 years ago. This pumice sheet covers the entire Forest and, indeed, much of the Pacific Northwest. It ranges in thickness from 10 feet at the south end of the Forest and 1 foot near Lava Butte, to a few inches over the northern half of the Forest.

Other pumice deposits include several in Newberry Crater, on the high flanks and south and east low flanks of Newberry Volcano, south of Pine Mountain, and the pumice covering a large area around Devil's Hill south of South Sister.

Basaltic ash 1,000 to 6,500 years old covers several areas west and north of Black Butte. These deposits were erupted from Blue Lake, the Sand Mountains, Forked Butte, and South Cinder Peak.

Wind has rapidly scattered and redeposited these air fall deposits, as well as other fine-grained material. Lava flows and other volcanic features, a few tens of thousands of years old, have become mostly buried by air fall and wind deposits.

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APPENDIX B

CLIMATE

Most large air masses move from west to east across Oregon. Much moisture is accumulated by these air masses upon passing over the Pacific Ocean. Before reaching the Deschutes National Forest, they must cross two mountain ranges, and in so doing lose much of the moisture as precipitation. Thus, air reaching the Deschutes National Forest is much drier than the original marine air. This results in a modified continental-type climate.

There is some variation from the westerly air mass influence. Occasionally, an Arctic air mass will reach the Forest and cause some extreme winter conditions. Periodically in the fall and winter, warm, dry easterly winds occur as a high pressure system builds up east of the Cascades with a low to the west; and, in the spring, it is not unusual to have warm "Chinook winds" from the south and southwest. Rapid snowmelt from these warm southwest winds results in periodic flooding conditions, mostly at the north end of the Forest, with conditions being especially critical when rainfall accompanies the warm air.

"Weather records have been kept in various parts of the Deschutes National Forest through the years, but most records have been seasonal, kept only in fire season. Records at Sisters have provided considerable information relative to weather of that area, and there have been some records from Crescent. But the Deschutes region has to depend primarily on the unbroken Bend weather records of nearly 70 years to interpret the areas varied weather."[1/] A climatological summary for Bend is shown in Figure 14.

There is a definite winter precipitation regime, with approximately 55 to 65 percent of the annual total occurring from November through March and only 8 to 12 percent from June through August. Yearly totals rise sharply with increase in elevation, but are much heavier on the upper slopes of the Cascades than at similar elevations on Paulina Mountain. Average annual totals range from 60 to 80 inches on the upper slopes of the Cascades to less than 12 inches along much of the eastern edge of the Forest. In a distance of only about 25 air miles from Bend to the South Sister, the annual precipitation increases from about 12 inches to over 80 inches. Snowfall is estimated to be as much as 250 to 350 inches per year on the upper slopes of the Cascades and about 20 inches annually at the lower elevations. Figure 15 shows the general precipitation amounts across the Deschutes National Forest.

Cloudiness in Central Oregon is the lowest in the State, averaging about 50 percent of the time. Each year in Bend, there are approximately 130 clear days and 90 partly cloudy days. Many of the 145 cloudy days provide some sunshine through thin cloudiness.

1/ Brogan, Phil - Visitor Information Service, Deschutes National Forest, 1969.

U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
IN COOPERATION WITH BEND CHAMBER OF COMMERCE
CLIMATOGRAPHY OF THE UNITED STATES NO. 20 - 35

Figure 14.

CLIMATOLOGICAL SUMMARY

LATITUDE 44° 04' N
LONGITUDE 121° 19' W
ELEV. (GROUND) 3,599 Feet

STATION Bend, Oregon

Means: 1942-1971
MEANS AND EXTREMES FOR PERIOD Extremes: 1901-1971

Month	Temperature (°F) Means: Daily maximum	Daily minimum	Monthly	Extremes: Record highest	Year	Record lowest	Year	** Mean degree days	Precipitation Totals (Inches): Mean	Greatest daily	Year	Snow, Sleet: Mean	Maximum monthly	Year	Greatest daily	Year	Mean number of days: Precip. .10 inch or more	Temperatures Max. 90° and above	Max. 32° and below	Min. 32° and below	Min. 0° and below	Month
(a)	30	30	30	71		71		30	30	71		30	70		70		30	30	30	30	30	
Jan	40.0	20.2	30.1	67	1971	-26	1950	1082	2.03	2.00	1903	14.0	56.5	1950	16.0	1955+	5	0	6	27	2	Jan
Feb	45.5	23.8	34.7	76	1923	-26	1933	848	1.02	1.94	1927	5.3	23.2	1917	12.0	1953+	3	0	2	24	1	Feb
Mar	49.5	24.3	36.9	83	1916	-13	1906	871	0.70	2.30	1908	4.6	19.5	1960	9.2	1960+	2	0	1	27	*	Mar
Apr	57.8	28.3	43.1	90	1926	8	1903	657	0.42	1.26	1904	1.8	23.7	1967	9.6	1967	1	0	*	22	0	Apr
May	65.1	34.3	49.7	93	1903	11	1903	474	1.09	1.65	1956	0.4	4.0	1922	4.0	1922	3	*	0	13	0	May
June	71.7	39.8	55.8	100	1926	22	1919	276	1.10	1.74	1950	0.0	T	1939+	T	1939+	3	1	0	5	0	June
July	81.9	43.6	62.8	104	1939	27	1955	96	0.30	1.32	1923	0.0	0.0		0.0		2	6	0	1	0	July
Aug	80.2	42.7	61.5	100	1921	25	1912	138	0.52	1.62	1950	0.0	0.0		0.0		1	3	0	2	0	Aug
Sep	73.9	36.9	55.4	98	1955	12	1902	297	0.32	0.96	1927	T	1.5	1934	1.5	1934	1	1	0	8	0	Sep
Oct	62.5	30.7	46.6	91	1917	3	1971	570	0.90	2.72	1950	0.2	7.4	1919	5.0	1919	2	0	*	18	0	Oct
Nov	49.4	26.4	37.9	77	1949	-14	1955	813	1.63	2.64	1960	3.7	18.5	1955	7.8	1961	4	0	1	22	*	Nov
Dec	42.0	23.1	32.6	69	1922	-25	1919	1004	1.92	2.41	1923	9.3	55.0	1919	28.0	1919	5	0	4	27	*	Dec
Year	60.0	31.2	45.6	104	July 1939	-26	Jan 1950+	7126	11.95	2.72	Oct. 1950	39.3	56.5	1950	28.0	Dec 1919	32	11	14	196	3	Year

(a) Average length of record, years.

T Trace, an amount too small to measure.

** Base 65°F

+ Also on earlier dates, months, or years.

* Less than one half.

CLIMATE OF BEND, OREGON

Bend lies along the western border of Central Oregon's high plateau area very near the geographical center of the State. Forested foothills of the Cascade Range begin immediately west of the city and terrace upward to a crest ridge of generally 5,000 to 6,000 feet elevation about 20 airline miles away. A number of mountains tower several thousand feet higher and a few remain partially snowcapped year around. The rolling plateau extends southward into California and Nevada and eastward into Idaho, broken only occasionally by hills or chains of relatively low mountains. The plateau northward is cut by canyons of the Deschutes and its tributaries and other drainage streams flowing into the Columbia.

Bend has primarily the dry, continental climate of the Great Basin along whose western edge it lies. The seasonal characteristics are well defined and changes between seasons are gradual. The partly sunny winters are cold with 67% of the annual moisture occurring from October through March. This light precipitation falls on 1 day out of 3 with snowfall providing 41% of the winter moisture. Brief thundershowers usually provide most of the very light summer rain from late June through mid-October. The hotter summer days are eased by low afternoon relative humidity, cool nights and the close proximity of the mountains. Sunny, fair weather continuing into mid-fall allows usual completion of harvesting activities before increased cloudiness and moisture is established by November.

Most storms move across the Deschutes County area from the west providing 40-100 inches of moisture annually in the Cascade Mountains while the drier east side valley areas range from 8-20 inches. The average 12-inch total for Bend has varied from 5.75 inches in 1959 to 25.75 inches in 1907. Bend receives 42% of its annual total in winter, 18% in spring, 16% in summer and 24% in fall. At least one dry month occurs in half of the years while wet months with over 4 inches of precipitation occur in 1 year out of 5. Measurable precipitation occurs on 81 days of the year with 24-hour amounts of 0.25 inch or more on 14 days, 0.50 inch or more on 5 days and 1.00 inch amounts on 1 day per year. Thunderstorms which provide some of the more intense summer moisture average about 15 per year. Recording rainfall gage data available since 1940 shows that a maximum 1-hour amount of 1.24 inches fell on August 8, 1950. For a 50-year return period, one could expect a maximum 6-hour total of 1.60 inches or a 24-hour total of 2.80 inches. Seasonal snowfall varies from 18 to 60 inches in 8 years out of 10 with greatest of 80.5 inches during the winter of 1950-51. This is generally the result of a number of light storms rather than any considerable depth at one time. Maximum snow depths exceed 24 inches in only 1 winter out of 20 with greatest of 47 inches recorded in December 1919. Snow rarely accumulates to more than a few inches in depth, or lies on the ground for any extended period. However, good winter snowpack in nearby mountains provides excellent skiing even into summer.

Moderate days and cool nights characterize Bend's year-around temperatures. The annual cycle of temperature provides only a 33-degree spread between the mean temperature of January and July. Winter and summer extremes are eased by a 24-hour range of temperature which averages from 19 degrees in December up to a 38-degree range in July. Annual temperature extremes (graphed on the reverse side) show that only 1 year out of 5 will be cooler than -17° or warmer than 100°. Subzero temperatures are experienced in 3 out of 4 years and average 3 such days per year. Light freezing minima will occur each month of the summer in 3 years out of 7 but the very short time of occurrence causes little or no damage. Latest spring freezes have come as early as May 14 in 1958 while earliest fall freezes have come as late as September 23 in 1950.

Statistical Likelihood (In Percent) That Various Temperatures Will Occur In Spring After Dates Indicated

Tempt.	90%	80%	70%	60%	50%	40%	30%	20%	10%
24°	4/18	4/25	4/30	5/5	5/9	5/13	5/18	5/23	5/31
28°	5/7	5/16	5/22	5/28	6/2	6/7	6/12	6/19	6/28
32°	6/4	6/9	6/13	6/17	6/20	6/23	6/26	6/30	7/6

Statistical Likelihood (In Percent) That Various Temperatures Will Occur In Fall Before Dates Indicated

Tempt.	10%	20%	30%	40%	50%	60%	70%	80%	90%
32°	6/28	7/11	7/19	7/27	8/3	8/10	8/18	8/27	9/8
28°	8/12	8/23	8/31	9/6	9/13	9/19	9/26	10/4	10/15
24°	9/18	9/26	10/1	10/6	10/10	10/14	10/19	10/24	11/1

Additional climatological details for the Bend area are provided by these interpolations. Average cloudiness of about 50% here in Central Oregon is lowest in the State. Clear days total 130 per year and 94 days are partly cloudy. Many of the remaining 141 cloudy days provide some sunshine through thin cloudiness. Early morning relative humidity averages 75-80% year around while mid-afternoon values vary from 25-35% in summer and 55-70% in winter. Surface winds prevail out of the south-southeast from October through February and west-northwest for remaining months. Hourly wind speeds average from 5 m.p.h. in August and September to 7 m.p.h. in winter months. Fastest 1-minute average winds of about 70 m.p.h. have occurred in this area with local (Continued on reverse side)

Stanley G. Holbrook, Climatologist for Oregon
M-10 Multnomah Bldg., Portland, Oregon 97204

April 1972

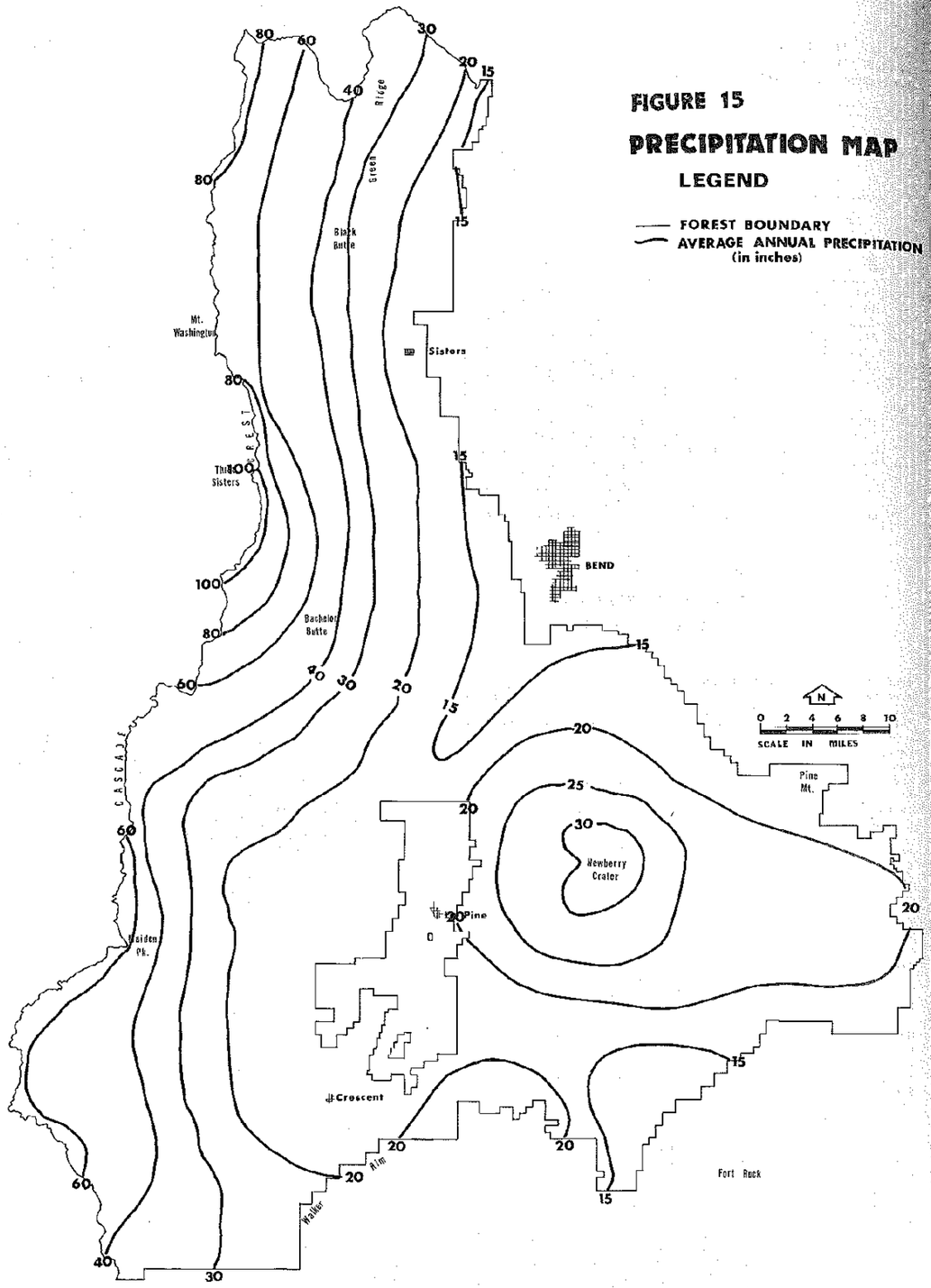


FIGURE 15

PRECIPITATION MAP

LEGEND

FOREST BOUNDARY

AVERAGE ANNUAL PRECIPITATION (in inches)

DESCHUTES NATIONAL FOREST

Temperatures on the Deschutes are characterized by moderate days and cool nights. Warmer day and night temperatures are encountered at the lower elevations. There are many microclimatic variations within any local area. Bend averages about 10 days per year with temperatures above 90°F and less than one day per year that exceeds 100°F. In the course of this soil inventory, surface soil temperatures as high as 165° were recorded. The coldest temperature on record is 26° below zero for Bend, although the winter daily minimum usually averages 20° to 25°.

Daytime humidities in the summer average 30 to 40 percent, although it is not unusual to have values between 10 and 20 percent during the day. Estimated lake evaporation rates range from 28 to 34 inches per year on the Forest, and potential evapotranspiration is from 20 to 30 inches.

The winter storms of the coastal areas also pass over this area but generally do little damage. Localized thunderstorms in the late spring and summer occur often and occasionally cause damage by lightning, wind, or heavy rains. Lightning-caused fires average about 83 fires per year. Hail or sleet storms are fairly common.

APPENDIX C

VEGETATION

The vegetation which occurs across the Forest is determined by the growth environment on any specified site. It varies with changes in temperature, moisture, and nutrient regimes as affected by factors such as elevation, precipitation, soil and underlying materials, slope, aspect, landform, and drainage characteristics. The major changes in vegetation on the Deschutes National Forest are caused by decrease in elevation and precipitation, and increase in temperatures in going eastward from the Cascade Crest.

Besides the overall west to east differences in vegetation related to elevation and precipitation, there are vegetation differences expressed by type of soil materials and the landform. Much less variety of species occurs on the coarse pumice soils than on finer textured soils. Generally where slopes are gentle and continuous, there are gradual changes in vegetation; and where slope changes are distinct, there are clear changes in plant communities. This is particularly true in areas with ponderosa and lodgepole pine where the ponderosa pine typically occurs on the more sloping land and lodgepole is on the flats.

The direction that a slope faces has a very significant effect in determining type of vegetation due to the differences in temperature and moisture regimes. South slopes, for example, are much hotter and drier than north slopes, and have a higher evapotranspiration rate. Vegetation differences are generally distinct on the north and south slopes. Aspect influences become more pronounced as the number of cloudless days during the summer increases, and the Deschutes is noted for its clear summer days, so this is an important factor determining the plant species that are present.

One means of ecological stratification of vegetation is by life zones, as described by Bailey 1/. The life zones found on the Deschutes National Forest include the Sonoran, Transition, Canadian, Hudsonian, and Arctic-Alpine. The extent of each zone is shown in Figure 16. A brief description of each of the life zones as summarized for the Deschutes National Forest by Deibert et al 2/ is given below:

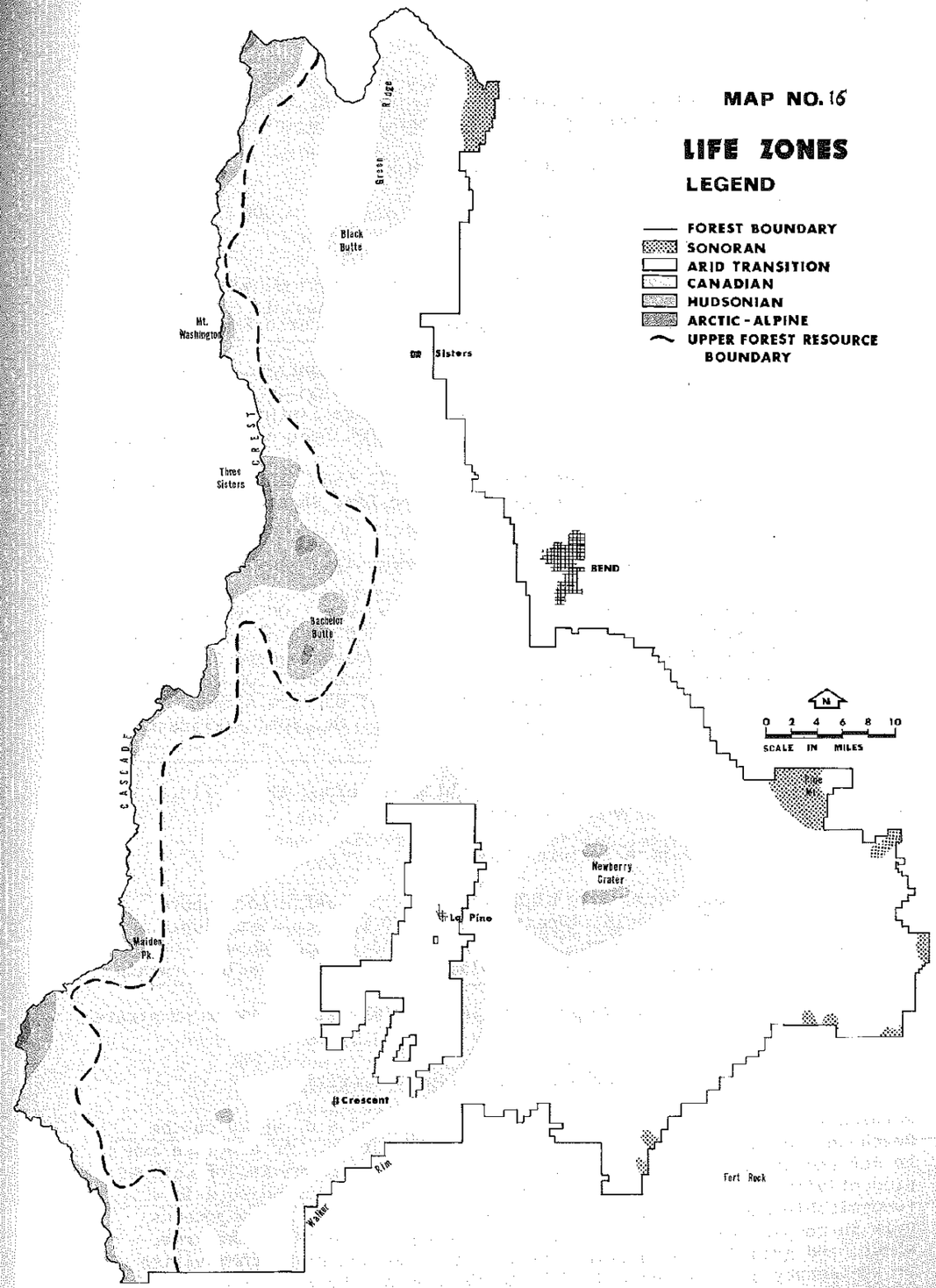
Life Zones on the Deschutes National Forest

1. Sonoran (Grass-Shrub Resource Zone)

   a. Elevation: Only lower margins of Forest on eastern boundary; east slope of Green Ridge 2,200 to 3,500 feet and eastern margins of Fort Rock 4,200 to 4,800 feet.

1/ Bailey, V. - North American Fauna, The Mammals and Life Zones of Oregon. USDA, Bureau of Biological Survey, 1936.

2/ Deibert, W. J.; Griffith, M. J.; and Zahl, K. - Fieldbook of Selected Wildlife. USDA Forest Service, Pacific Northwest Region, 1974.



MAP NO. 16

LIFE ZONES

LEGEND

- FOREST BOUNDARY
- SONORAN
- ARID TRANSITION
- CANADIAN
- HUDSONIAN
- ARCTIC - ALPINE
- UPPER FOREST RESOURCE BOUNDARY

DESCHUTES NATIONAL FOREST

b. Typical Dominant Vegetation: Big sagebrush, rabbitbrush with or without bitterbrush, wild currant, and juniper.

2. Transition (Principal Forest Resource Zone)

a. Elevation: Variable, approximately 2,500 to 6,000 feet; broad basal part of mountains.

b. Typical Dominant Vegetation: Ponderosa pine, Douglas-fir.

3. Canadian (Upper Principal-Lower Upper Forest Resource Zones)

a. Elevation: Variable; broad high part of mountains. For Example, Mt Jefferson--3,500 to 5,500 feet on cold slopes; 4,500 to 6,500 feet on warm slopes. Three Sisters--4,500 to 6,000 feet on cold slopes; 5,000 to 7,000 feet on warm slopes.

b. Typical Dominant Vegetation: Lodgepole pine, Engelmann spruce, western white pine, silver fir, grand fir, Shasta fir, and mountain hemlock.

4. Hudsonian (Upper portion of Upper Forest Resource Zone)

a. Elevation: Belt at timberline, rarely over 1,000 vertical feet wide. Mt. Jefferson--5,500 to 6,500 feet on cold slopes; 6,500 to 7,500 feet on warm slopes. Three-Fingered Jack. Black Butte. Mt. Washington. Three Sisters--6,000 to 7,000 feet on cold slopes; 7,000 to 8,000 feet on warm slopes. Broken Top. Packsaddle-Irish Mountain. Mt. Yoran-Emigrant Peak.

b. Typical Dominant Vegetation: Whitebark pine, alpine fir, dwarfed spruce, and mountain hemlock.

5. Arctic-Alpine (Alpine Resource Zone)

a. Elevation: Caps only highest peaks. Mt. Jefferson--above 6,500 feet on cold slopes; above 7,500 feet on warm slopes. Three Sisters--above 7,000 feet on cold slopes; above 8,000 feet on warm slopes. Diamond Peak. Packsaddle Mountain.

b. Typical Dominant Vegetation: Above timberline; low or prostrate alpine plants.

Ecoclasses and Plant Communities

Naturally occurring ecoclasses have been identified and mapped on the Deschutes National Forest, except in Wilderness areas. An ecoclass can be defined as one or more described natural plant communities of unique productivity and management potential occurring on the landscape in a recognizable and mappable manner. A plant commnnity is a homogeneous unit in respect to the number and relationship of plants in the tree, shrub, and ground cover strata. Naturally occurring plant communities in the survey area are described by L. Volland in The Plant Communities of the Central Oregon Pumice Zone.

Following is a listing of the final ecoclass map legend for the ecoclasses mapped on the Deschutes National Forest. This information can be referred to when using the table of Vegetation Characteristics of Landtypes in the main part of this Soil Resource Inventory Report.

Ecoclass Mapping Code	Plant Community	Community Code	Deschutes Ecoclass Code
P1	Ponderosa/fescue Ponderosa/bitterbrush/fescue	CP-G3-11 CP-S2-11	CPY1
P2	Ponderosa/bitterbrush-snowbrush/needlegrass Ponderosa/bitterbrush-manzanita/needlegrass Lodgepole/snowbrush-manzanita (sclerophyllous shrub)	CP-S3-11 CP-S2-13 CL-S9-11	CPY2
P3	Ponderosa/bitterbrush-manzanita/fescue Ponderosa/bitterbrush-snowbrush/fescue	CP-S2-17 CP-S3-14	CPY3
P4	Ponderosa/bitterbrush-snowbrush/sedge	CP-S3-12	CP-S3-12
P5	Ponderosa/bitterbrush/needlegrass (Pumice)	CP-S2-12	CP-S2-12
P6	Ponderosa/bitterbrush/needlegrass (Ash)	CP-S2-12	CP-S2-12
P7	Ponderosa/bitterbrush-manzanita/needlegrass (Ash) Ponderosa/bitterbrush-snowbrush/needlegrass (Ash)	CP-S3-11 CP-S2-13	CPY7
P8	Ponderosa/bitterbrush sagebrush/fescue Ponderosa/bitterbrush/bunchgrass	CP-S1-11 CP-S2-16	CPY8
P9	35% ponderosa/bitterbrush-manzanita snowbrush 30% mixed conifer/snowberry/pinegrass 35% mixed conifer/snowbrush-chinkapin/ pinegrass	CPY7 CD-S6-14 CD-C2-12	CPY9
P0	Ponderosa/snowbrush-chinkapin	CW-H1-11	CW-H1-11

continued

Ecoclass Mapping Code	Plant Community	Community Code	Deschutes Ecoclass Code
PF	Ponderosa/sedge-fescue-pcavine	CP-C2-12	CP-C2-12
PN	Ponderosa/bitterbrush/squirreltail (Rhyolite)	CP-S2-18	CP-S2-18
PS	Ponderosa/bitterbrush-sagebrush (Rhyolite)	CP-S1-12	CP-S1-12
J1	Juniper/bitterbrush/bunchgrass	CJ-S3-11	CJ-S3-11
L1	Lodgepole/sedgegrass wetland Lodgepole/blueberry/forb wetland Lodgepole invasion into meadow sites	CL-M1-11 CL-M3-11 CL-M9	CLY1
L2	Lodgepole/bearberry Lodgepole/bitterbrush/forb	CL-M2-11 CL-S2-13	CLY2
L3	Lodgepole/fescue Lodgepole/bitterbrush/fescue	CL-G3-12 CL-S2-14	CLY3
L4	Lodgepole/bitterbrush/sedge	CL-S2-12	CL-S2-12
L5	Lodgepole/bitterbrush/needlegrass Lodgepole/bitterbrush-currant/needlegrass	CL-S2-11 CL-S2-15	CLY5
L6	Lodgepole/needlegrass basins Lodgepole/sedge-needlegrass basins	CL-C3-11 CL-G4-13	CLY6
L7	Lodgepole/lupine-needlegrass Lodgepole/linanthastrum/needlegrass-lupine	CL-G4-11 CL-G3-13	CLY7
L8	Lodgepole/sedge-lupine-penstemon Lodgepole/sedge-lupine	CL-G4-12 CL-C4-11	CLY8

continued

Ecoclass Mapping Code	Plant Community	Community Code	Deschutes Ecoclass Code
L9	Lodgepole/bitterbrush (Rhyolite)	CL-S2-16	CL-S2-16
L0	Lodgepole/sagebrush (Rhyolite) Lodgepole/sagebrush/fescue	CL-S1-12 CL-S1-11	CLY0
W1	Mixed conifer/snowbrush-manzanita Mixed conifer/snowbrush	CW-S1-12 CW-S1-14	CWY1
W2	Mixed conifer/snowbrush-chinkapin	CW-H1-11	CW-H1-11
W3	Mixed conifer/snowbrush-chinkapin/brakenfern	CW-C2-11	CW-C2-11
W4	Mixed conifer/snowbrush-chinkapin/pinegrass	CW-C2-12	CW-C2-12
W5	Ponderosa/sedge-brakenfern	CP-C2-14	CP-C2-14
WB	Ponderosa/snowbrush/sedge-brakenfern	CP-C2-14	CP-C2-14
W6	Mixed conifer/snowbrush/sedge	CW-S1-15	CW-S1-15
W7	Mixed conifer/snowberry/pinegrass	CD-S6-14	CS-S6-14
W8	Mixed conifer/snowberry/forb	CD-S6-13	CD-S6-13
W9	Mixed conifer/snowberry/twinflower flatland	CD-S6-12	CD-S6-12
W0	Mixed conifer/snowbrush-manzanita/sedge-penstemon	CW-S1-13	CW-S1-13

continued

Ecoclass Mapping Code	Plant Community	Community Code	Deschutes Ecoclass Code
R1	Mixed conifer/manzanita Lodgepole/manzanita	CR-S1-11 CL-S1-11	CRY1
M1	Mountain hemlock/grouse huckleberry Lodgepole/grouse huckleberry	CM-S1-11 CL-S4-12	CMY1
M2	Mountain hemlock-lodgepole-true fir/ beargrass	CL-M4-11	CL-M4-11
E1	Engelmann spruce bottomlands	CW-CP-11	CW-CP-11
MD	Dry Meadow	MD-19-11	MD-19-11
MM	Moist Meadow (bluegrass) Moist Meadow (hairgrass)	MM-9 MM-19	MM
MW	Wet Meadow	MW	MW
S1	Big sagebrush/bunchgrass Big sagebrush-bitterbrush/bunchgrass Low sagebrush/fescue	SD-19-12 SD-29-12 SD-29-13	SD-1
S3	Big sagebrush/needlegrass (Rhyolite)	SD-29-14	SD-29-14
SD	Bitterbrush/needlegrass-sedge	SD-33-11	SD-2
G1	Bluegrass scabland	GB-99	GB-99
BF	Buckwheat Flat (Rhyolite)	SD-93-23	SD-93-23

Supplemental Ecoclass Designations*

Ecoclass Mapping Code	Plant Community	Community Code	Deschutes Ecoclass Code
SW	Willow Meadows	SW-19	SW-19
AG	Grasslands Permanent Pasture	AC	AG
WL	Lakes	WL	WL
NC	Cinders Lavas, Outwash with scattered conifers (less than 20% vegetation)	NC	NC
NR	Alpine Rockland with scattered conifers	NRA1	NRA1
	Rocky land with minimal potential	NR	NR
XX	Wilderness Areas	--	XX

*Not described in "Plant Communities of Central Oregon Pumice Zone"

SPECIES LIST 1/

Scientific Name		Alpha Code	Common Name
TREES			
Abies	amabilis	ABAM	Pacific silver fir
Abies	concolor	ABCO	White fir
Abies	lasiocarpa	ABLA2	Subalpine fir
Abies	manifica shastensis	ABMAS	Shasta red fir
Abies	procera	ABPR	Noble fir
Juniperus	occidentalis	JUOC	Western juniper
Larix	occidentalis	LAOC	Western larch
Libocedrus	decurrens	LIDE2	Incense cedar
Picea	engelmannii	PIEN	Engelmann spruce
Pinus	albicaulis	PIAL	Whitebark pine
Pinus	contorta	PICO	Lodgepole pine
Pinus	lambertiana	PILA	Sugar pine
Pinus	monticola	PIMO	Western white pine
Pinus	ponderosa	PIPO	Ponderosa pine
Populus	tremuloides	POTR	Quaking aspen
Pseudotsuga	menziesii glauca	PSMEG	Douglas-fir (interior)
Pseudotsuga	menziesii menziesii	PSMEM	Douglas-fir (coastal)
Tsuga	mertensiana	TSME	Mountain hemlock
SHRUBS			
Acer	circinatum	ACCI	Vine maple
Amelanchier	alnifolia	AMAL	Saskatoon serviceberry
Arctostaphylos	nevadensis	ARNE	Pinemat manzanita
Arctostaphylos	patula	ARPA	Greenleaf manzanita
Arctostaphylos	uva-ursi	ARUV	Bearberry
Artemisia	arbuscula	ARAR	Low sagebrush
Artemisia	tridentata	ARTR	Big sagebrush
Berberis	nervosa	BENE	Cascade oregongrape
Castanopsis	chrysophylla	CACH	Golden chinkapin
Ceanothus	prostratus	CEPR	Squawcarpet
Ceanothus	velutinus	CEVE	Snowbrush
Cercocarpus	ledifolius ledifolius	CELEL	Curlleaf mountainmahogany
Chimaphila	umbellata occidentalis	CHUMO	Princespine
Chrysothamnus	nauseosus	CHNA	Tall gray rabbitbrush
Chrysothamnus	viscidiflorus	CHVI	Tall green rabbitbrush
Haplopappus	bloomeri	HABL	Rabbitbrush goldenweed
Haplopappus	greenei	HAGR	Greenes goldenweed
Holodiscus	discolor	HODI	Creambush oceanspray
Leptodactylon	pungens	LEPU2	Granitegilia
Lonicera	cauriana	LOCA2	Fly honeysuckle
Lonicera	conjugialis	LOCO	Purpleflower honeysuckle
Lonicera	involucrata	LOIN	Bearberry honeysuckle
Phyllodoce	empetriformis	PHEM	Red mountainheath
Prunus	emarginata	PREM	Bitter cherry
Purshia	tridentata	PUTR	Antelope bitterbrush
Ribes	cereum cereum	RICE	Squaw currant
Ribes	viscosissimum	RIVI	Sticky current
Rosa	gymnocarpa	ROGY	Baldhip rose
Rubus	parviflorus	RUPA	Thimbleberry
Rubus	ursinus	RUUR	Trailing blackberry
Salix	scouleriana	SASC	Scouler willow
Spirea	menziesii	SPME	Menzies spirea
Symphoricarpos	albus	SYAL	Common snowberry
Terradymia	canescens	TECA	Gray horsebrush
Vaccinium	caespitosum	VACA	Dwarf huckleberry
Vaccinium	membranaceum	VAME	Big huckleberry
Vaccinium	occidentale	VAOC	Westernbog blueberry
Vaccinium	scoparium	VASC	Grouse huckleberry
GRASSES			
Agropyron	desertorum	AGDE	Standard crested wheatgrass
Agropyron	intermedium	ACIN2	Intermediate wheatgrass
Agropyron	spicatum	AGSP	Bluebunch wheatgrass
Agropyron	trachycaulum	AGTR	Slender wheatgrass
Agropyron	trichophorum	AGTR2	Pubescent wheatgrass
Agrostis	scabra	AGSC	Rough bentgrass
Alopecurus	pratensis	ALPR	Meadow foxtail
Bromus	commutatus	BRCO	Hairy brome
Bromus	inermis	BRIN	Smooth brome
Bromus	marginatus	BRMA	Mountain brome
Bromus	tectorum	BRTE	Cheatgrass brome
Bromus	vulgaris	BRVU	Columbia brome
Calamagrostis	canadensis	CACA	Bluejoint reedgrass
Calamagrostis	inexpansa	CAIN	Northern reedgrass
Calamagrostis	rubescens	CARU	Pinegrass
Dactylis	glomerata	DACL	Orchardgrass
Danthonia	californica	DACA	California oatgrass
Danthonia	intermedia	DAIN	Timber oatgrass
Danthonia	unispicata	DAUN	Onespike oatgrass
Deschampsia	caespitosa	DECA	Tufted hairgrass
Deschampsia	danthonioides	DEDA	Annual hairgrass
Elymus	glaucus	ELGL	Blue wildrye
Festuca	arundinacea	FEAR3	Alta fescue
Festuca	microstachys	FEMI	Small fescue
Festuca	occidentalis	FEOC	Western fescue
Festuca	ovina duriuscula	FEOVD	Hard fescue
Festuca	reflexa	FERE	Twoflower fescue
Festuca	rubra commutata	FERUC	Chewings fescue
Hordeum	nodosum	HONO	Meadow barley
Koeleria	cristata	KOCR	Prairie junegrass

Scientific Name		Alpha Code	Common Name
GRASSES			
Melica	aristata	MEAR	Bearded melic
Muhlenbergia	asperifolia	MUAS	Alkali muhly
Muhlenbergia	filiformis	MUFI	Pullup muhly
Muhlenbergia	richardsonis	MURI	Mat muhly
Phalaris	arundinacea	PHAR	Reed canarygrass
Phleum	alpinum	PHAL	Alpine timothy
Phleum	pratense	PHPR	Timothy
Poa	ampla	POAM	Sherman big bluegrass
Poa	cusickii	POCU	Cusick bluegrass
Poa	nervosa	PONE	Wheeler bluegrass
Poa	nevadensis	PONE2	Nevada bluegrass
Poa	pratensis	POPR	Kentucky bluegrass
Poa	secunda	POSE	Sandberg bluegrass
Sitanion	hystrix	SIHY	Bottlebrush squirreltail
Stipa	occidentalis	STOC	Western needlegrass
Stipa	thurberiana	STTH	Thurber needlegrass
Stipa	williamsii	STWI	Williams needlegrass
SEDGES and RUSHES			
Carex	athrostachya	CAAT	Slenderbeak sedge
Carex	buxbaumii	CABU3	Buxbaum sedge
Carex	filifolia	CAFI	Threadleaf sedge
Carex	lasiocarpa	CALA4	Slender bog sedge
Carex	nebraskensis	CANE	Nebraska sedge
Carex	pachystachya	CAPA	Chamisso sedge
Carex	pensylvanica	CAPE1	Long-stolon sedge
Carex	praelii	CAPR	Prael sedge
Carex	rossii	CARO	Ross sedge
Carex	simulata	CASI2	Analogue sedge
Juncus	balticus	JUBA	Baltic rush
Juncus	drummondii	JUDR	Drummond rush
Juncus	nevadensis	JUNE	Nevada rush
Juncus	orthophyllus	JUOR	Straight-leaf rush
Luzula	glabrata	LUGL	Smooth woodrush
FORBS			
Achillea	millefolium lanulosa	ACMIL	Western yarrow
Adenocaulon	bicolor	ADBI	Adenocaulon
Agoseris	glauca	AGGL	Pale agoseris
Antennaria	corymbosa	ANCO2	Flattop pussytoes
Antennaria	dimorpha	ANDI	Low pussytoes
Antennaria	geyeri	ANGE2	Pinewoods pussytoes
Antennaria	rosea	ANRO	Rose pussytoes
Apocynum	androsaemifolium pumilum	APANP	Low dogbane
Aquilegia	formosa	AQFO	Sitka columbine
Arabis	holboellii	ARHO	Holboell rockcress
Arabis	platysperma howellii	ARPLH	Broadseed rockcress
Arabis	suffrutescens	ARSUS	Woody rockcress
Arenaria	spp.	AREZ	Sandwort
Arnica	fulgens	ARFU	Orange arnica
Aster	canescens	ASCA	Hoary aster
Aster	ledophyllus	ASLE2	Cascades aster
Aster	occidentalis	ASOC	Western aster
Aster	radulinus	ASRA	Rough-leaf aster
Balsamorphiza	careyana	BACA	Carey balsamroot
Balsamorhiza	sagittata	BASA	Arrowleaf balsamroot
Castilleja	applegatei	CAAP2	Applegate paintbrush
Castilleja	miniata	CAMI2	Scarlet paintbrush
Clarkia	rhomboidea	CLRH	Clarkia
Clintonia	uniflora	CLUN	Queencup beadlily
Cynoglossum	occidentale	CYOC	Western houndstongue
Epilobium	angustifolium	EPAN	Fireweed
Epilobium	watsonii	EPWA	Watson willowweed
Erigeron	filifolius	ERFI	Threadleaf Fleabane
Eriogonum	compositum	ERCO5	Northern buckwheat
Eriogonum	heracleoides	ERHE	Wyeth buckwheat
Eriogonum	ovalifolium	EROV	Cushion buckwheat
Eriogonum	umbellatum	ERUM	Sulfur buckwheat
Eriophyllum	lanatum achillaceoides	ERLAA	Woolly eriophyllum
Fragaria	virginiana platypetala	FRVIP	Broadpetal strawberry
Galium	boreala	GABO	Northern bedstraw
Galium	triflorum	GATR	Sweetscented bedstraw
Gnaphalium	spp.	GNAZ	Cudweed
Goodyera	oblongifolia	GOOB	Rattlesnake plantain
Hackelia	floribunda	HAFL	Showy stickweed
Hieracium	albiflorum	HIAL	White hawkweed
Hieracium	cynoglossoides	HICY	Houndstongue hawkweed
Hieracium	gracile	HIGR	Slender hawkweed
Hieracium	scouleri	HISC	Scouler's hawkweed
Horkelia	fusca capitata	HOFUC	Tawny horkelia
Kelloggia	galioides	KEGA	Kelloggia
Lachyrus	lanszwertii	LALA2	Thickleaf peavine
Lilium	washingtonianum	LIWA	Washington lily
Linanthastrum	nuttallii	LINU	Linanthastrum
Linnaea	borealis americana	LIBOA	Twinflower
Linum	perenne	LIPE	Perennial flax
Lithospermum	ruderale	LIRU	Western gromwell

Scientific Name		Alpha Code	Common Name
FORBS			
Lomatium	nudicaule	LONU	Barestem lomatium
Lomatium	simplex	LOSI	Narrowleaf lomatium
Lomatium	triternatum	LOTR	Nineleaf lomatium
Lupinus	andersoni	LUAN	Pine lupine
Lupinus	argenteus	LUAR	Silvery lupine
Lupinus	caudatus	LUCA	Tailcup lupine
Lupinus	lepidus aridus	LULEA	Least lupine
Lupinus	lepidus lobbii	LULEL2	Least lupine
Mentzelia	albicaulis	MEAL2	Whitestem mentzelia
Mimulus	breweri	MIBR2	Brewer monkeyflower
Osmorhiza	chilensis	OSCH	Mountain sweetanise
Penstemon	cinicola	PECI	Smallflower penstemon
Penstemon	eoglaucus	PEELL	Glaucous penstemon
Penstemon	humilis	PEHU	Low penstemon
Phacelia	hastata leucophylla	PHHAL	Whiteleaf phacelia
Potentilla	anserina	POAN2	Silverweed
Potentilla	glandulosa	POGL	Gland cinquefoil
Potentilla	gracilis glabrata	POGRG	Slender cinquefoil
Pteridium	aquilinum pubescens	PTAQP	Brackenfern
Pterospora	andromedea	PTAN	Woodland pinedrops
Pyrola	dentata	PYDE	Toothleaf pyrola
Pyrola	picta	PYPI	Whitevein pyrola
Pyrola	secunda	PYSE	Sidebells pyrola
Ranunculus	alismaefolius	RAAL	Plaintainleaf buttercup
Ranunculus	occidentalis	RAOC	Western buttercup
Senecio	canus	SECA	Woolly groundsel
Senecio	integerrimus exaltatus	SEINE	Western groundsel
Senecio	serra	SESE	Butterweed groundsel
Senecio	triangularis	SETR	Arrowleaf groundsel
Smilacina	stellata	SMST	Starry solomonsplume
Spraguea	umbellata	SPUM	Umbellate pussypaws
Stephanomeria	lactucina	STLA	Skeleton weed
Taraxacum	officinale	TAOF	Common dandelion
Trientalis	latifolia	TRLA	Western starflower
Trifolium	longipes	TRLO	Longstem clover
Trifolium	repens	TRRE	White clover
Trifolium	wormskjoldi	TRWO2	Springbank clover
Viola	nuttallii	VINU	Nuttall violet
Viola	purpurea	VIPU	Goosefoot violet
Xerophyllum	tenax	XETE	Beargrass
PATHOGENS			
Arceuthobium	americanum		Dwarfmistletoe (lodgepole pine)
Arceuthobium	campylopodum f. abietinum		Dwarfmistletoe (white fir)
Arceuthobium	campylopodum f. campylopodum		Dwarfmistletoe (ponderosa pine)
Arceuthobium	campylopodum f. laricis		Dwarfmistletoe (western larch)
Arceuthobium	douglasii		Dwarfmistletoe (Douglas-fir)
Cronartium	comandrae		Comandra rust
Elytroderma	deformans		Elytroderma needlecast
Echinodontium	tinctorium		Indian paint fungus
Endocronartium	harknessii		Western gall rust
INSECTS			
Dendroctonus	brevicomis		Western pine beetle
Eucosma	sonomana		Western pine shootborer
MAMMALS			
Thomomys	talpoides		Northern pocket gopher

1/ This species list was taken from Plant Communities of the Central Oregon Pumice Zone, R-6 Area Guide 4-2. It covers most of the plants found on the Deschutes National Forest, but it is not complete for the high elevation species. Under the GRASSES, an addition should be made:
Festuca idahoensis FEID Idaho fescue

APPENDIX D

DEFINITIONS OF TERMS USED FOR INFORMATION ON LANDTYPES AND MAPPING UNITS

This section contains the terms and definitions used in compiling information for the TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES; VEGETATION CHARACTERISTICS OF LANDTYPES; TABLE OF SOIL CHARACTERISTICS OF MODAL SITE; TABLE OF BEDROCK CHARACTERISTICS; and MAPPING UNIT DESCRIPTIONS. Unless otherwise noted, the following definitions were developed for use in Soil Resource Inventories, R-6.

1. LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES

Landform - Refers to the shape and configuration of a specific, identifiable part of the landscape common to the landtype.

Slope Range - Range of the slope gradient of the landtype, expressed in percent.

Mean Slope - Estimated mean slope gradient of the landtype, expressed in percent.

Slope Aspect - Direction of slope exposure.

Broad Forest Type - Indicates the general growth zone of the landtype by listing representative tree species.

Elevation - Range of altitude above sea level, expressed in feet.

Precipitation - Estimated annual precipitation in inches.

Major Drainage Intensity and Pattern - Number of drainage miles per square mile and dominant drainage pattern.

Intensity Classes

Few - 0 to 1 drainage mile per square mile.

Common - 1 to 3 drainage miles per square mile.

Many - 3 to 5 drainage miles per square mile.

Abundant - Greater than 5 drainage miles per square mile.

Parent Materials - Geologic materials from which the soils have formed.

Depth of Buried Soil - Depth in inches of the layer of volcanic ejecta to the soil which had formed before the airlaid material was deposited.

Depth of Bedrock - Thickness of soil materials to bedrock, expressed in inches.

Type of Bedrock - General composition of the primary bedrock constituents.

Drainage Class - The rapidity and extent of removal of water from the soil. Based on soil permeability, infiltration, internal drainage, and topographic position.

Poorly Drained - Water table at or near the surface a considerable part of the time. Soils of this class usually occupy level or depressed sites and are frequently ponded. Water is removed so slowly that soil remains wet almost all the time.

Somewhat Poorly Drained - Water removed so slowly that the soil remains wet for significant periods, but not all the time.

Moderately Well Drained - Soil remains wet for a period somewhat longer (up to one month) than the wet seasons; may be due in part to a slowly permeable layer, high water table, or lateral seepage.

Well Drained - Water is removed from soil readily and these soils are saturated only during the wet season for short periods.

Excessively Drained - Water is removed from soil rapidly and these soils are rarely ever saturated. Commonly, these soils are coarse-textured or shallow, stony and/or occur on steep slopes.

Infiltration Rate - Rate of entry of water into soil surface. The rate is dependent upon the type of surface soil texture, rock fragement content, structure, porosity, bulk density, and organic matter content.

Infiltration Rate Classes

Slow - Water stands on surface for long periods. Soils are fine-textured, poorly aggregated, and puddle easily.

Moderate - Water enters soil at commensurated rates of normal rainfall or water application. Water may pond for short periods (a few days) following very intensive rainfall. Soils are medium-textured and well aggregated.

Rapid - Water rarely ponds, enters soil surface very rapidly. Soils are coarse-textured, porous, loose, and usually single-grained.

Root Distribution - Includes root size, abundance, and depth to zone of rooting. Note general depth of roots and zone of maximum concentration.

Size

Very Fine - 0.075 mm

Fine - 1 to 2 mm

Medium - 2 to 5 mm

Coarse - over 5 mm

Abundance

Few - 0 to 3/unit

Plentiful - 4 to 14/unit

Abundant - more than 14

A unit is a square inch for fine to very fine, and a square yard for medium and coarse roots.

Maximum Concentration

Depth interval, in inches, of the rooting zone. Distance is for the major rooting zone. Some roots may go deeper than maximums listed.

2. VEGETATION CHARACTERISTICS

Ecoclass Identification Code - This is a code used in R-6 to identify stable plant communities or groups of plant communities. It may be referred to as a TRI code (Total Resource Inventory).

Ecoclass Mapping Code - This is a two-digit code used in mapping plant communities or groups of plant communities on the Deschutes National Forest.

Percent Vegetative Cover - Evaluations of total vegetative cover and the cover of three distinct levels of vegetation above the soil surface. Overstory consists of the timber stand canopy. Understory consists of woody shrubs and timber regeneration. Ground cover consists of ferns, grasses, sedges, forbs, and mosses.

Total Ground Cover - Estimated percent of total vegetative cover with overstory, understory, and ground cover combined. Maximum of 100 percent.

Vegetative Cover by Each Level - Estimated percent vegetative cover according to species composition, with overstory, understory, and ground cover estimated separately. Maximum of 100 percent for each level.

Timber Site Species - The tree species used for Site Index and Site Class determination. Other species may occur on the landtype.

Timber Site Index - Site Index is expressed in height in feet at 100 years for ponderosa pine and Douglas-fir, and height at 50 years for lodgepole pine and white fir. Tables used for compilation are from "Field Instructions for Integrated Forest Survey and Timber Management Inventories in Oregon, Washington, and California," 1969.

Cubic Foot Site Class - Cubic foot production of wood per year as described in the reference mentioned above. Site Classes are listed below:

Potential Production - Mean Annual Increment

Class 1 -	Greater than 225	cu. ft./yr.
Class 2 -	165-224	cu. ft./yr.
Class 3 -	120-164	cu. ft./yr.
Class 4 -	85-119	cu. ft./yr.
Class 5 -	50-84	cu. ft./yr.
Class 6 -	20-49	cu. ft./yr.
Class 7 -	Less than 20	cu. ft./yr.

Range Productivity - Production of available forage in pounds per acre per year. This does not include brush species and does not consider the effects of tree spacing control or other management which would increase the forage.

3. SOIL CHARACTERISTICS

Soil - Any and all loose, naturally occurring, unconsolidated, weathered material on the earth's surface resting on solid, consolidated, unweathered bedrock, regardless of origin, mode of formation, or type of weathering or deposition. Generally includes any material that may be manipulated by handtools or heavy equipment without the need of blasting, except soft, unweathered bedrock.

Depth of Soil to Bedrock - Distance from soil surface to consolidated, unweathered bedrock. Depth is in feet or inches.

Very shallow - Less than 10 inches.

Shallow - 10 to 20 inches.

Moderately deep - 20 to 40 inches.

Deep - 40 to 60 inches.

Very deep - Greater than 60 inches.

Depth to Restrictive Layer in the Soil - Distance from soil surface to a layer in the soil that is highly restrictive to drainage, water transmission or root growth. Usually this is a discontinuity or stratification layer, but it may be bedrock. If it is bedrock, depth must be the same as recorded under depth to bedrock. A restrictive layer is generally not a genetic soil horizon, except in old soils that have developed claypan, hardpan, or cemented horizons. Depth is in inches.

Litter - Total depth in inches of decomposed and undecomposed organic matter.

Soil Layer - Each soil layer is a homogeneous layer of soil material. Soil layers are described when soil characteristics change significantly and have definite effects on management. Each layer may result from stratification or soil formation processes.

Soil Layer Thickness - Thickness of each soil layer in inches.

Soil Layer Thickness Classes

Thin - Less than 10 inches.

Moderately thick - 20 to 40 inches.

Thick - 40 to 60 inches.

Very thick - Greater than 60 inches.

Color - Stated in narrative Munsel notations for each soil layer. Colors are taken of moist crushed soil. Mottling is noted, if present.

Texture - Relative proportions of sand (2.0mm.-.05mm.), silt (.05mm.-.002mm.), and clay (less than .002mm.). Standard USDA textural classes are used for each soil layer.

Textural Classes* - These classes apply when general textural terms are used for the profile sketch in the mapping unit descriptions.

Coarse-textured Soils - Sands, loamy sands.

Moderately coarse-textured soils - Sandy loam, fine sandy loam.

Medium-textured soils - Very fine sandy loam, loam, silt loam, silt.

Moderately fine-textured soils - Clay loam, sandy clay loam, silty clay loam.

Fine-textured soils - Sandy clay, silty clay, clay.

Rock Fragment Quantity, Size, and Shape* - Percent by volume occupied by consolidated fragments larger than sand size (larger than 2mm.).

Size Classes - Gravel, 2mm. - 3 inches; cobbles, 3 inches to 10 inches; stones, greater than 10 inches.

Shape Classes - Round, thin, flat, subangular, subround, angular, blocky, etc.

Rock Fragment Classes - Used as an adjective to textural classes. Includes gravel, cobble and stone sizes.

0 - 35 percent - not noted.
35 - 50 percent - gravelly, cobbly or stony.
50 - 80 percent - very gravelly, very cobbly or very stony.
80 percent + - extremely gravelly, extremely cobbly or extremely stony.

Soil Structure* - Includes grade, size and type of structure for each soil layer. If no structure exists, then the soil is massive or single-grained. Concretions or shot are recorded, if present. Applies to aggregate structural units (aggregates and peds).

Grade - Degree of aggregation and expression of the differential between cohesion within aggregates and adhesion between aggregates.

Weak - Indistinct peds, barely observable in place.

Moderate - Distinct peds, moderately durable and evident.

Strong - Distinct peds in place, durable.

*Standard USDA Handbook 18 Definitions.

Size - Refers to size of aggregates according to five size classes and type of structure.

Type - Refer to relative shape of individual aggregates. There are four primary basic shapes.

Platy - Soils particles arranged around a plane; generally horizontal.

Prism-like - Soil particles arranged around a vertical line and bounded by relatively flat surface (Prismatic, Columnar).

Block-like - Soil particles arranged around a point and bounded by flat or rounded surfaces (Angular Blocky, Subangular Blocky).

Spheroidal - Soil particles arranged around a point and bounded by curved or very irregular surface (granular, crumb).

Structureless - No observable aggregation or no definite orderly arrangement of natural lines of weakness.

Massive The soil material is coherent.

Single Grain - The soil material is incoherent.

Cementation* - Includes degree of cementation and the agent of cementation (Ca, Fe, Al, Si). Cementation is generally caused by a chemical process.

Degree of Cementation

Weak - Soil aggregates can be easily broken by hand and usually nonrestrictive to water and roots. Example: fragipan.

Strong - Soil aggregates are difficult to break by hand or hand tools and resist movement and penetration of water and roots. Water may be perched or ponded for short periods. Aggregates can be penetrated by hand tools.

Indurated - Soil aggregates are insoluble in water and cannot be broken by hand tools. Aggregates are totally restrictive to water and roots and usually require ripping or blasting.

Compaction - Relative increase in bulk density which is caused by natural pedogenic processes.

Degree of Compaction

Weak - Soil aggregates are easily broken by hand and are usually nonrestrictive to water and roots.

Moderate - Soil aggregates are difficult to break by hand and resist movement and penetration of water and roots. Water may be perched or ponded for short periods of time.

Strong - Soil aggregates cannot be broken by hand. The soil exhibits nearly total restriction to water and root penetration and usually requires ripping or blasting.

Permeability - Water or air movement in and through the soil material. The classes are based on soil texture, rock fragment content, porosity, and bulk density.

Class

Very Slow - Generally fine-textured soils - clay. Less than 0.5 inch/hr.

Slow Generaly moderately fine-textured soils - clay loams and silty clay loams; 0.5 inch/hr. to 1 inch/hr.

Moderate - Generally medium-textured soils - loams, silt loams; 1 inch/hr. to 5 inches/hr.

Rapid - Generally moderately coarse-textured soils, sandy loams, gravelly loams; 5 inches/hr. to 20 inches/hr.

Very Rapid - Very porous soils. Generally coarse-textured soils - sands and gravels. Greater than 20 inches/hr.

Consistence* - Degree of cohesion and adhesion as indicated by the resistance of the soil aggregate to deformation or rupture under various moisture conditions.

Dry

Loose - Noncoherent.

Soft - Easily crushes to powder or single grain.

Slightly Hard - Easily broken between thumb and forefinger.

Hard - Can be broken in the hands without difficulty, but difficult to break between thumb and forefinger.

Very Hard - Can be broken in hands without difficulty.

Extremely Hard - Cannot be broken in hands.

Moist

Loose - Noncoherent.

Very Friable - Crushes under gentle pressure.

Friable - Crushes easily under gentle to moderate pressure between thumb and forefinger.

Firm - Crushes under moderate pressure between thumb and forefinger.

Very Firm - Crushes under strong pressure; barely crushable between thumb and forefinger.

Extremely Firm - Crushes under very strong pressure; cannot be crushed between thumb and forefinger.

Wet

Stickiness is measured by pressing wet soil between fingers.

Nonsticky - Practically no adherence when pressure is released.

Slightly Sticky - After pressure, soil adheres to both thumb and finger, but comes off one rather cleanly. Does not stretch appreciably.

Sticky - After pressure, soil adheres to both thumb and finger and tends to stretch somewhat before pulling apart from either digit.

Very Sticky - After pressure, soil adheres strongly to both digits and is markedly stretched when they are separated.

Plasticity is measured by rolling wet soil and observing wire.

Nonplastic - No wire is formable.

Slightly Plastic - Wire forms, but soil mass easily deformed.

Plastic - Wire forms; moderate pressure required to deform soil mass.

Very Plastic - Wire forms; much pressure required to deform soil mass.

Soil pH - Intensity of soil acidity or alkalinity expressed on a scale from 1 to 14:

	pH		pH
Extremely acid	- Below 4.5	Neutral	- 6.5 - 7.3
Strongly acid	- 4.6 - 5.5	Slightly alkaline	- 7.4 - 8.4
Slightly acid	- 5.6 - 6.4	Strongly alkaline	- 8.5 - 9.0
		Very strongly alkaline	- Above 9.0

Classification - Estimated taxonomic classification at family level.

4. BEDROCK CHARACTERISTICS

These terms are found in the Table of Bedrock Characteristics of Mapping Units.

Bedrock - Consolidated, competent rock which upon weathering produces loose or unconsolidated soil material. In terminology of soil horizon designation, bedrock is designated the "R" layer. Bedrock material usually requires ripping and/or blasting. Includes soft materials that are unweathered, such as some sedimentary rock which can be bladed. (Example: Sandstone.)

Composition - Bedrock components and percentage. (Example: Sandstone (20), Conglomerates (70), Mudstone (10).)

Color - Color is in narrative terms for fresh, unweathered surfaces.

Hardness - Relative rating based on ease of breaking rock with geology hammer:

Hard - Rock cannot be broken or only with great difficulty.

Moderately Hard - Rock can readily be broken with hammer, but not by hand.

Soft - Rock can be broken by hand.

Degree of Fracturing - Based on the number or frequency of fractures and joints in a rock unit:

Highly Fractured - Entire rock unit is completely dissected by fractures and joint less than 1 foot apart.

Moderately Fractured - Fractures divide rock unit into units or blocks generally from 1 to 5 feet apart.

Slightly Fractured - Only occasional fractures noted.

Massive - No fractures or very few fractures noted.

Fracture System - Pattern which the rock fractures follow. Example: horizontal, platy, vertical, blocky, random, etc.

Fracture Surface - Indicates the characteristics of the fracture surface and void space within fractures.

Regular - Smooth, distinct, sharp, clean-fractured surfaces.

Irregular - Rough, irregular, fragmented fracture surfaces.

Competency - Relative inherent strength of rock as it occurs on the landscape, based on degree of weathering, fracturing, hardness, stability, and failures observed:

Competent - No failures within rock unit observed. Rocks of unit are stable and have strong resistance to mass movement.

Moderately Competent - Some failues are noted. Rocks of the unit are moderately stable and have some resistance to mass movement.

Incompetent - Failures are common to rock unit. Rocks of the unit are soft, deeply weathered, and have high potential for mass movement.

APPENDIX E

DEFINITIONS OF MANAGEMENT INTREPRETATIONS 1/

This Appendix contains the definitions for the management interpretations. These include Erosion and Hydrologic Interpretations, Recreation, Timber Management, Engineering, and Range Management.

1/ Unless otherwise noted, the following definitions were developed for use in Soil Resource Inventories, R-6.

1. EROSION AND SOME HYDROLOGIC INTERPRETATIONS

Erosion and some hydrologic interpretations include erosion and water management interpretations. Interpretations for erosion include the two major kinds of erosion--surface and mass movement. Surface erosion pertains only to surface soil loss by runoff and overland flow. Mass movement pertains to all types of soil and bedrock movement which occurs below the soil surface such as landslips, slumps, slides, rockfall, and land flow.

Natural Stability

This rating is based on the relative stability of the mapping units as they occur in the natural state. This includes any movement or loss other than surface erosion. Kind of movement includes slumps, slides, and all kinds of deep-seated failures. This rating applies throughout Region 6.

I. Very Stable - No evidence of failure.

II. Stable - Occasional failures are observed.

III. Moderately Stable - Several failures are observed.

IV. Unstable - Many failures are observed.

V. Very Unstable - Entire area shows evidence of recent and past failures.

Nature of Mass Movement

This is an estimation of the kind and/or size of mass movement observed.

Expected Mass Movement as a Result of Man's Activities

This rating indicates the expected mass movement resulting from man's activities as compared to stability under natural conditions. Ratings are based on soil and bedrock characteristics, slopes, revegetation potential, and effects of timber removal, road construction, and fire.

Unchanged - The expected mass movement is relatively unchanged from that of the natural state.

Increased - The expected mass movement is greater than that of the natural state.

Greatly Increased - The expected mass movement is much greater than that of the natural state.

Surface Soil Erosion Potential

This rating is based on expected losses of surface soil when all vegetative cover, including litter, is removed. Evaluations of climate, slope gradient, and length, soil characteristics, hydrologic characteristics of the soil and bedrock materials of each landtype unit are considered in making ratings.

Low - Little loss of soil materials is expected. Some minor sheet and rill erosion may occur.

Moderate - Some loss of surface soil materials can be expected. Rill erosion and some small gullies or sheet erosion may be occurring. Sheet erosion can be determined by some soil pedestals and observable accumulation of soil materials along the upslope edge of rocks and debris. At this level of erosion, there is a possible fertility loss.

High - Considerable loss of surface soil materials can be expected. Rill erosion, numerous small gullies or evidence that considerable loss from sheet erosion may occur. Sheet erosion is indicated by frequent occurrence of soil pedestals and considerable accumulation of soil materials along the upslope edge of rocks and debris. This is accompanied by a probable fertility loss.

Severe - Large loss of surface soil material can be expected in the form of many large gullies and/or numerous small gullies or large loss from sheet erosion. Sheet erosion loss is exhibited by numerous examples of soil pedestals and extensive accumulation of soil materials along the upslope edge of rocks and debris. This is accompanied by a fertility loss.

Water Yield Class

This interpretation is an indication of the rate and amount of water yield expected from each soil. It is based on factors such as soil characteristics, infiltration rates, permeability, slope, climate, vegetation, and drainage patterns.

Class I - These soils have a high water detention storage capacity and a low rate of runoff. Little water is yielded to peak flows until detention storage capacity is exceeded or unless the soils are initially saturated or frozen. They are important in sustaining high base flow due to a relatively large volume of water held in detention storage.

Class II - These soils have a moderate water detention storage capacity and a moderate rate of runoff. Water contributes to both peak flows and base flow.

Class III - These soils have a low water detention storage capacity and a high rate of runoff. The storage capacity is low and easily exceeded with most of the water contributing to peak flow. Little water is yielded to sustain base flow.

Bedrock Hydrologic Characteristics

This interpretation indicates the relative capacity of bedrock to store and transmit water. The rating is based on bedrock kind, texture, type, and extent of fracturing, frequency of jointing, bedding characteristics, and degree of weathering.

Class I - This indicates that the bedrock has a relatively high capacity to store water. The water transmission rate is low unless the storage capacity is exceeded. Rocks in this class include sandstones because of their texture, fracture, and bedding characteristics, and basalts where water occurs in large tubes and other cavities or in the interflow zone between successive lava flows.

Class II - This indicates that the bedrock has a moderate capacity to store water. The rate of water transmission is moderate. Rocks in this class are generally hard to moderately hard, moderately fine textured, and moderately to highly fractured siltstone, mudstone, pyroclastics, argillite and schist.

Class III - This indicates that the bedrock has a relatively low capacity to store water. The rate of water transmission is rapid. Rocks generally in this class are fractured, coarse crystalline (i.e., granite, gabbro and gneiss) and other hard-fractured rocks such as conglomerate.

Class IV - This indicates that the bedrock has both low-storage capacity and low rate of water tranmission. Rocks in this class are generally highly weathered, fine-textured, and lack open fracture channels.

Hydrologic Group

This interpretation is a grouping of soils into four classes, indicating the general infiltration and water movement ability of the soil and bedrock materials. This method of ratings has been developed by the Soil Conservation Service. The four groups are the standard SCS groupings and definitions.

Group A - Soils having high infiltration rates, even thoroughly wetted, consisting chiefly of deep, well to excessively drained sands and/or gravel. These soils have a high rate of water transmission and would result in a low runoff potential.

Group B - Soils having moderate infiltration rates when thoroughly wetted, consisting chiefly of moderately deep to deep, moderately well to well drained soils, with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

Group C - Soils having slow infiltration rates when thoroughly wetted, consisting chiefly of (1) soils with a layer that impedes the downward movement of water or (2) soils with moderately fine to fine texture and a slow infiltration rate. These soils have a slow rate of water transmission.

Group D - Soils having very slow infiltration rates when thoroughly wetted, consisting chiefly of (1) clay soils with high swelling potential, (2) soils with a high permanent water table, (3) soils with claypan or clay layer at or near the surface, and (4) shallow soils over nearly impervious materials. These soils have a very slow rate of water transmission.

Sediment Yield Potential

This interpretation indicates the potential for water sedimentation and pollution from sand, silt, and clay particles following timber harvest, road construction, or other activities. Factors considered in making ratings are soil texture and structure, drainage patterns, landform, and climate.

Low - Sedimentation levels of silt and clay particles are not expected to be significant following management activities. Soils are generally moderately coarse-textured.

Moderate - Sedimentation levels may be significantly increased following management activities with moderate loss of water quality and damage to fisheries. Soils are generally medium-textured.

High - Sedimentation levels are expected to be high following management activities. Streams become turbid and there is considerable loss of water quality and damage to fisheries. Soils are generally fine to moderately fine-textured.

Expected Sediment Size

This interpretation indicates the expected sediment size reaching the streams resulting from erosion of each unit.

2. TIMBER MANAGEMENT

Interpretations for Timber Management are of two types. One type includes some interpretations that directly affect timber management, such as "Potential for Regeneration." The other type indicates the effect on soils and other resources from timber harvest activities.

Susceptibility to Brush Competition

This indicates the susceptibility of mapping units to revegetate naturally by brush following timber harvest. These ratings are based on soil characteristics, field observation, slope, aspect, climate, and elevation.

Low - Indicates brush vegetation is insignificant.

Moderate - Indicates that some brush revegetation will occur.

High - Indicates brush revegetation is very dense.

Susceptibility to Sedge or Grass Competition

This indicates the susceptibility of mapping units to revegetate naturally by sedges or grass following timber harvest.

Low - Indicates the potential for sedge or grass competition is insignificant.

Moderate - Indicates that some sedge or grass competition will occur.

High - Indicates that sedge or grass cover will be dense.

Potential for Regeneration

This interpretation indicates the potential for each landtype unit to regenerate at a minimum level of stocking as set by the Forest Service. Factors included in this interpretation are soil characteristics, climate, aspect, elevation, frost potential, brush competition, and tree species--includes planted stock and natural regeneration.

Low - This rating indicates the potential for regeneration is low. Probability of success is very limited. Major regeneration problems can be expected and reseeding or replanting may be required throughout the area. Several years may elapse before an adequate stocking level is achieved.

Moderate - This rating indicates that some problems will be encountered in attaining a satisfactory stocking level. Usually, regeneration is spotty and some replanting will be necessary.

High - This rating indicates that regeneration has a high probability of success. Few problems should be encountered in attaining good stocking levels.

Limitations to Regeneration

This indicates the major soil limitations to regeneration of planted stock and naturals.

Suggested Tree Planting Species

This column lists the tree species that the soil, climate, and topographic factors indicate may be best suited for planting.

Potential Soil and Water Impacts from Various Timber Harvest Methods

This interpretation indicates the susceptibility of soil and water resources to incur damage from various timber harvest methods. Each landtype is evaluated as to the potential impact from each of the following harvest methods: Tractor logging, cable (no suspension), cable (partial suspension), cable (full suspension), and aerial logging. The evaluation of potential impact includes soil and water resource damages from timber removal, spur roads, landings, and other activities that may be associated with the harvest method being evaluated. The evaluations are based on a full operating season. Damage is caused to soils by creating soil disturbance which may destroy soil structure, cause compaction, and increase erosion. This may affect other resources through loss of production, lower water quality and yield, and loss of fisheries. Field observations indicate the most important factors to consider in making these ratings are wetness of soil, soil texture and structure, percentage of coarse fragments, slope, drainage, climate, and field observations.

Low - This rating indicates that the impacts to the soil and water resources are minor. Little or no soil damage is expected.

Moderate - This rating indicates that the impacts to the soil and water resources are moderate. Soil and water resources are expected to incur moderate damage.

High - This rating indicates that the impacts to the soil and water resources are major. Excessive damage to soil and water resources is likely to occur.

Type of Damage Expected During and Subsequent to Timber Harvest Operations

This indicates the type of soil and water resource damage expected on each soil from various harvest methods.

3. ENGINEERING

Interpretations for engineering include characteristics for roads, foundations, bedrock, and some miscellaneous interpretations. These are presented in two tables: One table, "Characteristics Pertinent to Roads and Airfields," is a standard engineering table for road construction based on the Unified Soil Classification System. The other table, "General Engineering Interpretation," gives other engineering interpretations which will be useful to engineers and other resource managers. These interpretations are explained and defined in this section. Generally, the following interpretations and ratings are based on the entire landtype unit including soil, bedrock, and landform. Some interpretations are based only on the soil material or bedrock material. These are stated in the description for each interpretation. The interpretations pertaining to roads are based on standard Forest Service regulations and construction methods presently used.

Unified Classification

Each soil is classificd as to its Unified Classification. Those soils with significant layers of different soil materials will have a classification for each layer designated. The classification will be made for some representative soils by laboratory testing. Those soils not tested will be classified by comparing their properties to those tested.

Suitability for Use as Topsoil Source

This rating evaluates each soil as to its suitability for use as topsoil. It does not specify any particular use of the topsoil. Ratings are based on soil characteristics.

Suited - Soil texture ranges from sandy loam to clay loam. Gravel content is less than 35 percent and soil layer is at least 3 feet thick.

Unsuited - This rating indicates the soils do not satisfy the requirements specificd under "Suited." However, soils rated "Unsuited" may still satisfy a particular requirement. Sec the "Table of Soil Characteristics" for soil texture, thickness, and gravel content.

Suitability of Soil as Sand and/or Gravel Source

This interpretation indicates the suitability of each soil as a possible source of sand and/or gravel. It does not indicate the kind or quality of sand or gravel, or refer to any specific use of the sand and/or gravel.

Suited - This rating indicates that sand and/or gravel is present and the following conditions are satisfied. There is a layer present which is composed of 80 percent, by volume, of sand and/or gravel. This layer is at least 4 feet.

Unsuited - This rating indicates that sand and/or gravel is generally not present in amounts which satisfy the requirements under "Suited." However, soils rated "Unsuited" may still satisfy a particular requirement. See the Table of Soil Characteristics for soil depth and gravel content.

Suitability of Soil as a Possible Clay Source

This rating indicates the suitability of each soil as a possible source of clay. It does not indicate the kind or quality of clay or refer to any specific use of the clay.

Suited - This rating indicates that the soil is a possible source of clay. Soils with this rating have the following: Texture ranges from clay loam to clay. Gravel content is less than 35 percent. This layer is at least 2 feet thick.

Unsuited - Soils with this rating generally are not possible sources for clay.

Suitability of Bedrock for Road Rock

This interpretation indicates the general suitability of rock when used as road rock for base course or wearing surface. These ratings are based on rock hardness, density, and susceptibility to weathering and breakdown. Soils are not rated when depth to bedrock is greater than 12 feet. (Cautionary note: This information is for broad planning purposes only. Specific onsite characterization data are required to accurately determine rock suitability.)

Unsuited - Rock is soft and breaks down rapidly under logging traffic.

Poor - Rock is only moderately hard and breaks down easily under logging traffic; usually in one or two years' time.

Fair - Rock is hard and dense, but tends to break down under logging traffic after about two to four years' use.

Good - Rock is hard, dense, and resists breakdown under logging traffic.

Limitations of Bedrock for Road Rock

This column indicates the major limitation of the bedrock for road rock use.

Consideration for Road Location and Construction

This column indicates the major considerations for road location and construction through each soil. The rating evaluates the impact of road construction on other resources and/or road construction problems likely to be encountered.

Method of Excavation

This interpretation refers to excavation methods most commonly used and required for each soil. This includes soil, bedrock, and cemented and/or compacted layers in the soil. Methods are blading, ripping, and/or blasting. (Cautionary note: These appraisals are subject to change as machinery capabilities change.)

Cutbank and Ditch Erosion Potential

This interpretation indicates the potential for subsoil erosion by running water on each soil. Subsoil refers to that material from approximately the 2-foot depth extending to bedrock. It includes erosion which takes place along road ditches and on cutslopes. Rating is of soil material only and does not apply when cutbank or ditch is in bedrock. Factors considered in making ratings are field observations, texture and structure of subsoil materials, permeability, compaction, and climate.

Low - Factors indicate that little or no subsoil erosion is likely to occur.

Moderate - Factors indicate that the subsoils have moderate erosion potential.

High - Factors indicate that the subsoils are likely to erode severely.

Susceptibility to Cutbank Sloughing and Raveling

This rating evaluates each unit for its susceptibility to sloughing or raveling after excavation. Ratings are based on cutbanks at least 10 feet high. Factors include field observations, soil and bedrock characteristics, backslope ratio, frost action, climate and potential for revegetation.

Low - Sloughing and/or raveling is a minor problem requiring occasional road maintenance.

Moderate - Sloughing and/or raveling causes some damage. Annual road maintenance is usually adequate.

High - Sloughing and raveling occur at a rate that often plugs culverts and fills inside ditches. Frequent road maintenance with heavy equipment such as front-end loader is required.

Probability of Cutbank Failures

This interpretation indicates the probability of failures in cutbanks following road construction or excavation for buildings. Failures are considered to be at least 5 cubic yards of material in volume. Ratings are based on cutbanks of at least 5 feet in height and refer to more than a 50-percent chance for failures. These ratings are the same as in the Mantle Stability Surveys.

I. Very Stable - Practically no probability of chance of cutbank failures.

II. Stable - Probability of no more than 3 failures per mile of road cutbank.

III. Moderately Stable - Probability of 4 to 8 failures per mile of road cutbank.

IV. Unstable - Probability of 9 to 15 failures per mile of road cutbank.

V. Very Unstable - Probability of more than 15 failures per mile of road cutbank.

Suggestions for Cutbank Stability Problems

This rating gives suggestions, when applicable, to increase stability of cutbanks or reduce damage from raveling and sloughing.

Failure Potential on Road Waste and Fills

This interpretation rates the soil units as to the susceptibility of failure occurring on fill and sidecast waste material and related damage to resources. Failures are defined as a loss or partial loss of road fill or sidecast material on the fill slope.

Considered are initial and subsequent failures cased by construction, erosion and additional sidecast during maintenance. Failures result in damage to various resources. Stream sedimentation levels are increased, resulting in an adverse effect on both water quality and fisheries. Timber growth potential is affected as fill slope areas no longer contribute to production. Occasionally, the failures do damage to the road itself. The ratings are based on current road construction practices and procedures and on type of soil materials, natural drainage of the site, landform, slope of the fill, and field observation.

Low - Failure on road waste and fills is sufficiently low to result in only minor damage to resource values.

Moderate - Failures on road waste and fills occur with sufficient frequency to cause moderate damage to resource values.

High - Failures on road waste and fills occur at a rate and magnitude sufficient to cause major damage to resource values.

Erosion Potential on Road Waste and Fills

This interpretation rates the soil units as to the susceptibility of erosion occurring on fill and sidecast waste material and related damage to resources. Erosion is a loss of surface soil from fill or sidecast.

This erosion contributes sedimentation to streams. Timber growth potential is affected as fill slope areas no longer contribute to production. The ratings are based on current road construction practices and procedures and on type of soil materials, natural drainage of the site, landform, slope of the fill, and field observation.

Low - Erosion on road waste and fills is sufficiently low to result in only minor damage to resource values.

Moderate - Erosion on road waste and fills occurs with sufficient magnitude to cause moderate damage to resource values.

High - Erosion on road waste and fills occurs at a magnitude sufficient to cause major damage to resource values.

Suitability of Road Waste and Fill Slopes to Seeding

This interpretation indicates the probable success of fill slope seeding. Factors considered in making ratings are soil characteristics, elevation, slope, climate, snowpack, and frost hazard. Ratings are based on current methods and practices of seeding, grass species, fertilizer application and time of seeding.

Poor - Probability of success is low. Seeding generally is not successful and requires three or more reseedings and special treatments.

Fair - Success is likely on about 50 percent of area treated. Requires one or two followup treatments. Seeding usually becomes well established within two years. Little followup seeding necessary.

Good - Probability of high success. Seeding usually becomes well established within two years. Little followup seeding is necessary.

Limitations to Cutbank Seeding

This indicates the major limitations to success of cutbank seeding.

Suggestions for Cutbank Seeding

This indicates special treatment to be given, when applicable, to increase the chance of success of cutbank seeding.

4. RECREATION

Interpretations for recreation pertain primarily to recreation development. They are based on soil and bedrock properties, drainage, landform and vegetation. Factors such as aesthetics and accessibility are not considered when making these ratings. The following interpretations are some most generally needed for planning recreation developments.

Landtype Suitability for Recreation Area Development

This rating is based on soil and bedrock characteristics and topographic features of each unit as related to recreation development such as campground and picnic sites. Factors important to this interpretation are soil depth, texture, structure, permeability, drainage, topography, and susceptibility to flooding.

Unsuited - This rating indicates that soils and/or topography are of a nature which would prohibit recreation development without extensive modification.

Low - These soil units have major limitations to recreation development, but limited development is feasible.

Moderate - This rating indicates that the soil unit is generally suitable for recreation development, but has minor limitations.

High - These soils are particularly well suited for recreation development. Generally, they have no limitations.

Landtype Limitations for Recreation Development

This indicates the major soil limitations to recreation development.

Treatment to Increase Suitability

This indicates, when applicable, the treatment necessary to increase the suitability for recreation development.

Soil and Site Damage Susceptibility

This interpretation applies to recreational areas after development. Each soil that is suitable or can be made suitable for campground development is rated for its susceptibility to damage of soil and/or site by normal recreation use. Site includes vegetation as well as soil conditions. Factors used in determining ratings include erosion potential, soil compactibility, and vegetative growth potential.

Low - These soils resist compaction and have low erosion potential. The native vegetation is hardy and not readily destroyed. These soils will withstand and hold up well under continual use.

Moderate - These soils are not readily compacted or eroded and vegetative types are somewhat hardy. In general, these soils and site can sustain continual use, but require some rehabilitation.

High - These soils are fragile and easily damaged and have vegetation that is not hardy, easily damaged and generally herbaceous. Under normal use, the the vegetation will very likely be destroyed, the soil compacted and/or eroded to such a degree that periodic nonuse and major rehabilitation will be required.

Susceptibility to Dustiness

This interpretation pertains only to the soils suitable for recreation development, and applies primarily to unsurfaced roads within recreation areas.

Low - Factors indicate dust will not be a problem.

Moderate - Under normal conditions, dust will not be a problem, but under heavy use and droughty conditions, dust very likely will be a problem.

High - Factors indicate dust will be a problem. Dust abatement measures are necessary under normal conditions and use.

Susceptibility to Muddiness

This interpretation pertains only to the soils suitable or those that can be made suitable for recreation development. This interpretation rates each soil as to its susceptibility to becoming muddy. The rating is limited to the surface soil under normal conditions. Factors include soil characteristics, climate and drainage.

Low - Muddiness is not likely to be a problem. Factors indicate soils are not susceptible to muddiness.

Moderate - Soils become muddy at times for short periods, occasionally causing problems. Road rock is necessary. Campground closure may be necessary during wet periods.

Trail Suitability

This interpretation indicates the suitability of each soil for trails. Factors include soil and bedrock characteristics, drainage, climate, and slope.

Low - These soils have properties which severely limit their use for trails. Extensive treatment measures are required.

Moderate - These soils have some limitations for trail development. Certain treatment measures may be required.

High - These soils have no limitations for trail development.

Limitations for Trails

This indicates the limitations for trails.

Considerations for Trail Improvements and Protection

This indicates some treatment measures to be considered in improving suitability and protecting trails.

Suitability for Sewage Filter Field

This interpretation evaluates the soil as to its suitability as a sewage filter field. Ratings are based on soil depth, texture, permeability, drainage and slope. Only those soils suitable for recreation development are rated. Onsite investigation is recommended before design or installation of filter system.

Poor - These soils have properties which make them poorly suited as sewage filter fields. Sewage filter disposal in these soils would be ineffective and create major problems.

Moderate - These soils have properties which limit their use as sewage filter field. They require a large filter area for adequate drainage which limits the capacity of the campground.

Well - These soils are well suited to sewage filter use and offer only minor limitations, if any.

Soil Limitation to Sewage Filter Field Use

This indicates the major limitations to sewage filter field use.

5. RANGE MANAGEMENT

Range management interpretations are presented to enable better range-land management through utilization of soil information. These interpretations are oriented toward use by domestic livestock.

Limitations for Domestic Livestock and Wildlife Use

This interpretation indicates the major topographic and site limitations existing on the mapping unit that would hinder use by domestic livestock and wildlife. Forage or the potential for establishing good forage is not considered in this interpretation.

Susceptibility to Compaction

This interpretation indicates the soil inherent ability to resist compaction by hoofed animals. Factors important to this interpretation are: soil texture, structure, bulk density, pore size and distribution, and rate of infiltration.

Low - Factors indicate that the soil will resist compaction.

Moderate - Factors indicate that the soil has tendencies to become compacted under livestock and wildlife use. Time of grazing on these soil units is important.

High - Factors indicate that soil compaction will be severe unless livestock use is withheld until the soils have adequately dried.

Susceptibility to Soil Displacement

This interpretation indicates the general susceptibility of the unit to be displaced by livestock grazing. Soil displacement is the downslope movement of soil. Animal trampling causes loosening of soil particles which are moved downslope by gravity, wind, and water. Displacement ratings are based on such facts as texture, slope, and field observations.

Low - Factors indicate that displacement is insignificant. Slopes usually are less than 35 percent.

Moderate - Factors indicate that moderate soil displacement will occur.

High - Factors indicate that displacement is severe and slopes usually exceed 50 percent.

Potential for Range Improvement through Seeding

This interpretation indicates the potential for each mapping unit to be improved through seeding. Factors used to determine the potential for range improvement through seeding are climate, topography, natural vegetation, and the soil characteristics that relate to water-holding capacity and fertility.

Low - This rating indicates the potential for a successful grass seeding is low. Probability of success is very limited.

Moderate - This rating indicates that some problems will be encountered in attaining a satisfactory grass cover.

High - This rating indicates that necessary conditions for a successful grass cover establishment exist.

Limitations to Range Seeding

This interpretation indicates the major limitations to successful range improvement through seeding. Limitations are based on field observations, topography, climate, and soil characteristics.

APPENDIX F

SOIL MATERIALS TESTING RESULTS

This Appendix contains some standard soil test results used for Engineering. The samples tested are representative of some of the soil materials found in the survey areas. These data are presented only as an indicator of the type of materials to expect on the landtypes represented.

The testing was done at the Soil Materials Laboratory, Deschutes National Forest, using standard soil testing methods.

LANDTYPE NO. 16	
LOCATION SE¼, SE¼, Sec. 33, T. 17 S., R. 9 E.	GRADATION ANALYSIS
DEPTH: 17 - 40" UNIFIED: SP-SM ASSHO: A-3	SIEVE SIZE / % PASSING
LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.	3" / --
pH (BY PHOTOVOLT pH METER): 5.90	1 1/2" / 100
MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:	3/4" / 99
HYDROMETER ANALYSIS:	3/8" / 97
	No. 4 / 96
	No. 10 / 95
BULK DENSITY: 0.67	No. 40 / 69
42 pounds per cubic foot	No. 100 / 13
	No. 200 / 8.7

LANDTYPE NO. 22	
LOCATION NW¼, Sec. 14, T. 13 S., R. 8 E.	GRADATION ANALYSIS
DEPTH: 10 - 30" UNIFIED: SM-d ASSHO: A-2-4	SIEVE SIZE / % PASSING
LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.	3" /
pH (BY PHOTOVOLT pH METER): 6.65	1 1/2" /
MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:	3/4" /
HYDROMETER ANALYSIS:	3/8" /
	No. 4 / 100
	No. 10 / 98
BULK DENSITY: 1.08	No. 40 / 88
67.2 pounds per cubic foot	No. 100 / 49
	No. 200 / 20.6

LANDTYPE NO. 22	
LOCATION SE¼,NW¼, Sec. 25, T. 12 S., R. 8 E.	GRADATION ANALYSIS
DEPTH: 0 - 20" UNIFIED: SM-d ASSHO: A-1-b	SIEVE SIZE / % PASSING
LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.	3" / 100
pH (BY PHOTOVOLT pH METER): 6.70	1 1/2" / 78
MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:	3/4" / 75
HYDROMETER ANALYSIS:	3/8" / 73
	No. 4 / 56
	No. 10 / 51
BULK DENSITY: 1.17	No. 40 / 41
73.3 pounds per cubic foot	No. 100 / 26
	No. 200 / 15.0

LANDTYPE NO. 22

LOCATION SE¼, NW¼, Sec. 25, T. 12 S., R. 8 E.

DEPTH: 40 - 48" UNIFIED: SM-d ASSHO: A-1-a

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER): 6.50

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS:

BULK DENSITY: 1.78

110.8 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	100
1 1/2"	90
3/4"	75
3/8"	67
No. 4	58
No. 10	49
No. 40	35
No. 100	24
No. 200	7.2

LANDTYPE NO. 22

LOCATION SE¼,NW¼ Sec. 25, T. 12 S., R. 8 E.

DEPTH: 60 - 72" UNIFIED: GP GM ASSHO: A-1-a

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER): 6.70

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS:

BULK DENSITY: 1.63

101.6 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	87
1 1/2"	77
3/4"	64
3/8"	51
No. 4	42
No. 10	34
No. 40	20
No. 100	13
No. 200	9.2

LANDTYPE NO. 29

LOCATION NW¼,SE¼, Sec. 21, T. 18 S., R. 10 E.

DEPTH: 37 - 50" UNIFIED: SP-SM ASSHO: A-1-b

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER): 6.20

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS:

BULK DENSITY: 1.41

88 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	100
1 1/2"	72
3/4"	69
3/8"	64
No. 4	59
No. 10	53
No. 40	43
No. 100	23
No. 200	11.6

LANDTYPE NO. 33

LOCATION SE¼,NE¼, Sec. 26, T. 13 S., R. 8 E.

DEPTH: 0 - 20" UNIFIED: SP-SM ASSHO: A-1-b

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER): 6.50

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS:

BULK DENSITY: 0.98

61.3 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	--
1 1/2"	--
3/4"	100
3/8"	97
No. 4	86
No. 10	56
No. 40	10
No. 100	7
No. 200	5.4

LANDTYPE NO. 33

LOCATION SE¼,NE¼, Sec. 26, T. 13 S., R. 8 E.

DEPTH: 48 - 54" UNIFIED: SP ASSHO: A-1-a

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER): 6.60

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS:

BULK DENSITY: 1.12

70.3 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	--
1 1/2"	100
3/4"	98
3/8"	92
No. 4	62
No. 10	25
No. 40	6
No. 100	5
No. 200	3.2

LANDTYPE NO. 37

LOCATION NW¼,SW¼, Sec. 23, T. 14 S., R. 9 E.

DEPTH: 0 - 20" UNIFIED: SM-d ASSHO: A-2-4

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER): 6.70

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS:

BULK DENSITY: 1.20

75.1 pounds per cubic foot

CRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	
1 1/2"	
3/4"	
3/8"	100
No. 4	90
No. 10	85
No. 40	74
No. 100	45
No. 200	21.6

LANDTYPE NO. 37

LOCATION NW¼,SE¼, Sec. 23, T. 12 S., R. 9 E.

DEPTH: 20 - 40" UNIFIED: SM-d ASSHO: A-2-4

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER): 7.10

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS:

BULK DENSITY: 1.29
80.3 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	
1 1/2"	100
3/4"	84
3/8"	80
No. 4	77
No. 10	71
No. 40	54
No. 100	29
No. 200	14.8

LANDTYPE NO. 37

LOCATION NW¼,SW¼, Sec. 23, T. 12 S., R. 9 E.

DEPTH: 40 - 64" UNIFIED: GP ASSHO: A-1-a

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER): 7.15

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS:

BULK DENSITY: 1.50
93.4 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	58
1 1/2"	40
3/4"	31
3/8"	28
No. 4	26
No. 10	23
No. 40	16
No. 100	19
No. 200	4.5

LANDTYPE NO. 37

LOCATION NW¼,SW¼, Sec. 23, T. 12 S., R. 9 E.

DEPTH: 65 - 80" UNIFIED: GW ASSHO: A-1-a

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER): 7.10

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS:

BULK DENSITY: 1.64
102.4 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	100
1 1/2"	77
3/4"	55
3/8"	41
No. 4	31
No. 10	21
No. 40	8
No. 100	2
No. 200	0.5

LANDTYPE NO. 52

LOCATION SW¼,NW¼, Sec. 20, T. 18 S., R. 10 E.

DEPTH: 20 - 30" UNIFIED: SC ASSHO: A-2-4

LIQUID LIMIT: 33 PLASTICITY INDEX: 10

pH (BY PHOTOVOLT pH METER): 6.40

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS: 50% sand
38% silt
22% clay

BULK DENSITY: 1.01
63 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	--
1 1/2"	100
3/4"	91
3/8"	89
No. 4	87
No. 10	81
No. 40	60
No. 100	43
No. 200	31.7

LANDTYPE NO. 60

LOCATION NW¼,NE¼, Sec. 12, T. 12 S., R. 10 E.

DEPTH: 3 - 8" UNIFIED: SM-d ASSHO: A-2-4

LIQUID LIMIT: 29 PLASTICITY INDEX: N.O.

pH (BY PHOTOVOLT pH METER): 6.65

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS: 45% sand
42% silt
13% clay

BULK DENSITY: 1.09
68.1 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	--
1 1/2"	--
3/4"	--
3/8"	100
No. 4	99
No. 10	93
No. 40	67
No. 100	37
No. 200	24.7

LANDTYPE NO. 61

LOCATION NE¼, NE¼, Sec. 24, T. 13 S., R. 9 E.

DEPTH: 3 - 12" UNIFIED: SM-d ASSHO: A-2-4

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER): 6.8

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS: 83% sand
14% silt
3% clay

BULK DENSITY: 1.30
81 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	--
1 1/2"	--
3/4"	100
3/8"	93
No. 4	87
No. 10	80
No. 40	54
No. 100	42
No. 200	20.2

LANDTYPE NO. 61

LOCATION NE¼,NE¼, Sec. 24, T. 13 S., R. 8 E.

DEPTH: 15 - 25" UNIFIED: SM-d ASSHO: A-2-4

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER): 6.65

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS: 53% sand
34% silt
13% clay

BULK DENSITY: 1.34
83.5 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	
1 1/2"	
3/4"	100
3/8"	96
No. 4	88
No. 10	81
No. 40	58
No. 100	34
No. 200	24.1

LANDTYPE NO. 62

LOCATION NW¼,SE¼, Sec. 1, T. 12 S., R. 10 E.

DEPTH: 0 - 9" UNIFIED: SM-d ASSHO: A-2-4

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER): 6.65

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS: 50% sand
35% silt
15% clay

BULK DENSITY: 0.93
57.8 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	
1 1/2"	
3/4"	
3/8"	100
No. 4	95
No. 10	91
No. 40	67
No. 100	41
No. 200	22.8

LANDTYPE NO. 6B

LOCATION NE¼,NE¼, Sec. 9, T. 23 S., R. 11 E.

DEPTH: 0 - 6" UNIFIED: SP-SM ASSHO: A-1-b

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER): 6.55

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS:

BULK DENSITY: 0.64
40 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	
1 1/2"	
3/4"	
3/8"	100
No. 4	98
No. 10	89
No. 40	39
No. 100	14
No. 200	10.3

LANDTYPE NO. 6B

LOCATION NE¼,NE¼, Sec. 9, T. 22 S., R. 11 E.

DEPTH: 18 - 24" UNIFIED: SP ASSHO: A-1-b

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER): 6.50

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS:

BULK DENSITY: 0.40
25 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	--
1 1/2"	--
3/4"	100
3/8"	99
No. 4	99
No. 10	97
No. 40	41
No. 100	6
No. 200	4.6

LANDTYPE NO. 6B

LOCATION NE¼,NE¼, Sec. 9, T. 22 S., R. 11 E.

DEPTH: 36 - 42" UNIFIED: SM-d ASSHO: A-2-4

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER): 6.50

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS:

BULK DENSITY: 1.36
85 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	--
1 1/2"	100
3/4"	98
3/8"	97
No. 4	95
No. 10	94
No. 40	76
No. 100	33
No. 200	16.0

LANDTYPE NO. 95

LOCATION NE¼,NE¼, Sec. 32, T. 13 S., R. 8½ E.

DEPTH: 0 - 20" UNIFIED: Sm-d ASSHO: A-2-4

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER): 6.30

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS:

BULK DENSITY: 1.12
70 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	
1 1/2"	
3/4"	
3/8"	
No. 4	
No. 10	100
No. 40	84
No. 100	35
No. 200	13.8

LANDTYPE NO. 95

LOCATION NE¼,NE¼, Sec. 32, T. 13 S., R. 8½ E.

DEPTH: 40 - 50" UNIFIED: SP-SM ASSHO: A-1-a

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER): 6.50

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS:

BULK DENSITY: 1.12

72 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	81
1 1/2"	78
3/4"	72
3/8"	65
No. 4	57
No. 10	34
No. 40	22
No. 100	11
No. 200	0.6

LANDTYPE NO. 96

LOCATION SE¼,SW¼, Sec. 4, T. 24 S., R. 9 E.

DEPTH: 0 - 10" UNIFIED: SM-d ASSHO: A-1-b

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER): 6.10

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS:

BULK DENSITY: 0.86

54 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	
1 1/2"	
3/4"	
3/8"	100
No. 4	98
No. 10	90
No. 40	43
No. 100	21
No. 200	4.1

LANDTYPE NO. 96

LOCATION SE¼,SE¼, Sec. 4, T. 24 S., R. 9 E.

DEPTH: 15 - 24" UNIFIED: SW-SM ASSHO: A-1-b

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER): 6.50

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS:

BULK DENSITY: 0.44

28 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	
1 1/2"	
3/4"	100
3/8"	98
No. 4	89
No. 10	68
No. 40	25
No. 100	9
No. 200	8.0

LANDTYPE NO. 96

LOCATION SE¼,SE¼, Sec. 4, T. 24 S., R. 9 E.

DEPTH: 40 - 50" UNIFIED: SP ASSHO: A-1-b

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER): 7.0

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS:

BULK DENSITY: 0.64

40 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	
1 1/2"	
3/4"	
3/8"	
No. 4	100
No. 10	98
No. 40	30
No. 100	3
No. 200	2.6

LANDTYPE NO. 96

LOCATION SE¼,SE¼, Sec. 4, T. 24 S., R. 9 E.

DEPTH: 55 - 62" UNIFIED: Sm-d ASSHO: A-1-b

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER):

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS:

BULK DENSITY: 1.64

102 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	100
1 1/2"	91
3/4"	85
3/8"	79
No. 4	72
No. 10	63
No. 40	46
No. 100	21
No. 200	1 3.0

LANDTYPE NO. 96

LOCATION SE¼,SE¼, Sec. 4, T. 24 S., R. 9 E.

DEPTH: 75 - 90" UNIFIED: GW ASSHO: A-1-a

LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.

pH (BY PHOTOVOLT pH METER):

MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:

HYDROMETER ANALYSIS:

BULK DENSITY: 1.76

110 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	96
1 1/2"	88
3/4"	67
3/8"	50
No. 4	37
No. 10	25
No. 40	9
No. 100	3
No. 200	1.5

LANDTYPE NO. 9Z
LOCATION NW¼,NW¼, Sec. 24, T. 24 S., R. 7 E.
DEPTH: 0 - 10" UNIFIED: SW-SM ASSHO: A-1-b
LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.
pH (BY PHOTOVOLT pH METER): 6.60
MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:
HYDROMETER ANALYSIS:
BULK DENSITY: 0.64
40 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	--
1 1/2"	--
3/4"	100
3/8"	99
No. 4	93
No. 10	79
No. 40	32
No. 100	12
No. 200	8.0

LANDTYPE NO. 9Z
LOCATION NW¼, NW¼, Sec. 24, T. 24 S., R. 7 E.
DEPTH: 15 - 30" UNIFIED: SP ASSHO: A-1-b
LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.
pH (BY PHOTOVOLT pH METER): 6.80
MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:
HYDROMETER ANALYSIS:
BULK DENSITY: 0.51
32 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	--
1 1/2"	--
3/4"	--
3/8"	97
No. 4	85
No. 10	62
No. 40	11
No. 100	4
No. 200	2.8

LANDTYPE NO. 9Z
LOCATION NW¼,NW¼, Sec. 24, T. 24 S., R. 7 E
DEPTH: 40 - 55" UNIFIED: SP ASSHO: A-1-b
LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.
pH (BY PHOTOVOLT pH METER): 7.0
MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:
HYDROMETER ANALYSIS:
BULK DENSITY: 0.58
36 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	--
1 1/2"	--
3/4"	--
3/8"	100
No. 4	99
No. 10	94
No. 40	21
No. 100	3
No. 200	2.4

LANDTYPE NO. 9Z
LOCATION NW¼,NW¼, Sec. 24, T. 24 S., R. 7 E.
DEPTH: 70 - 80" UNIFIED: SM-d ASSHO: A-1-b
LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.
pH (BY PHOTOVOLT pH METER): 6.7
MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:
HYDROMETER ANALYSIS:
BULK DENSITY: 1.44
90 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	72
1 1/2"	58
3/4"	58
3/8"	57
No. 4	52
No. 10	44
No. 40	3
No. 100	20
No. 200	13.1

LANDTYPE NO. 9L
LOCATION SE¼,SE¼, Sec. 36, T. 26 S., R. 7 E.
DEPTH: 15-24" UNIFIED: SP ASSHO: A-1-a
LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.
pH (BY PHOTOVOLT pH METER): 6.80
MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:
HYDROMETER ANALYSIS:
BULK DENSITY: 0.61
38 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	--
1 1/2"	100
3/4"	95
3/8"	90
No. 4	65
No. 10	35
No. 40	3
No. 100	2
No. 200	1.4

LANDTYPE NO. 9L
LOCATION SE¼,SE¼, Sec. 36, T. 26 S., R. 7 E.
DEPTH: 40 - 60" UNIFIED: SP ASSHO: A-1-a
LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.
pH (BY PHOTOVOLT pH METER): 7.0
MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:
HYDROMETER ANALYSIS:
BULK DENSITY: 0.62
39 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	--
1 1/2"	--
3/4"	100
3/8"	93
No. 4	77
No. 10	45
No. 40	1
No. 100	0.5
No. 200	

LANDTYPE NO. 9Z
LOCATION NW¼,NW¼, Sec. 24, T. 24 S., R. 7 E.
DEPTH: 0 - 10" UNIFIED: SW-SM ASSHO: A-1-b
LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.
pH (BY PHOTOVOLT pH METER): 6.60
MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:
HYDROMETER ANALYSIS:
BULK DENSITY: 0.64
40 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	--
1 1/2"	--
3/4"	100
3/8"	99
No. 4	93
No. 10	79
No. 40	32
No. 100	12
No. 200	8.0

LANDTYPE NO. 9Z
LOCATION NW¼, NW¼, Sec. 24, T. 24 S., R. 7 E.
DEPTH: 15 - 30" UNIFIED: SP ASSHO: A-1-b
LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.
pH (BY PHOTOVOLT pH METER): 6.80
MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:
HYDROMETER ANALYSIS:
BULK DENSITY: 0.51
32 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	--
1 1/2"	--
3/4"	--
3/8"	97
No. 4	85
No. 10	62
No. 40	11
No. 100	4
No. 200	2.8

LANDTYPE NO. 9Z
LOCATION NW¼,NW¼, Sec. 24, T. 24 S., R. 7 E
DEPTH: 40 - 55" UNIFIED: SP ASSHO: A-1-b
LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.
pH (BY PHOTOVOLT pH METER): 7.0
MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:
HYDROMETER ANALYSIS:
BULK DENSITY: 0.58
36 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	--
1 1/2"	--
3/4"	--
3/8"	100
No. 4	99
No. 10	94
No. 40	21
No. 100	3
No. 200	2.4

LANDTYPE NO. 9Z
LOCATION NW¼,NW¼, Sec. 24, T. 24 S., R. 7 E.
DEPTH: 70 - 80" UNIFIED: SM-d ASSHO: A-1-b
LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.
pH (BY PHOTOVOLT pH METER): 6.7
MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:
HYDROMETER ANALYSIS:
BULK DENSITY: 1.44
90 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	72
1 1/2"	58
3/4"	58
3/8"	57
No. 4	52
No. 10	44
No. 40	3
No. 100	20
No. 200	13.1

LANDTYPE NO. 9L
LOCATION SE¼,SE¼, Sec. 36, T. 26 S., R. 7 E.
DEPTH: 15-24" UNIFIED: SP ASSHO: A-1-a
LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.
pH (BY PHOTOVOLT pH METER): 6.80
MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:
HYDROMETER ANALYSIS:
BULK DENSITY: 0.61
38 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	--
1 1/2"	100
3/4"	95
3/8"	90
No. 4	65
No. 10	35
No. 40	3
No. 100	2
No. 200	1.4

LANDTYPE NO. 9L
LOCATION SE¼,SE¼, Sec. 36, T. 26 S., R. 7 E.
DEPTH: 40 - 60" UNIFIED: SP ASSHO: A-1-a
LIQUID LIMIT: N.P. PLASTICITY INDEX: N.P.
pH (BY PHOTOVOLT pH METER): 7.0
MINIMUM ELECTRICAL RESISTIVITY, OHMS PER CC:
HYDROMETER ANALYSIS:
BULK DENSITY: 0.62
39 pounds per cubic foot

GRADATION ANALYSIS	
SIEVE SIZE	% PASSING
3"	--
1 1/2"	--
3/4"	100
3/8"	93
No. 4	77
No. 10	45
No. 40	1
No. 100	0.5
No. 200	

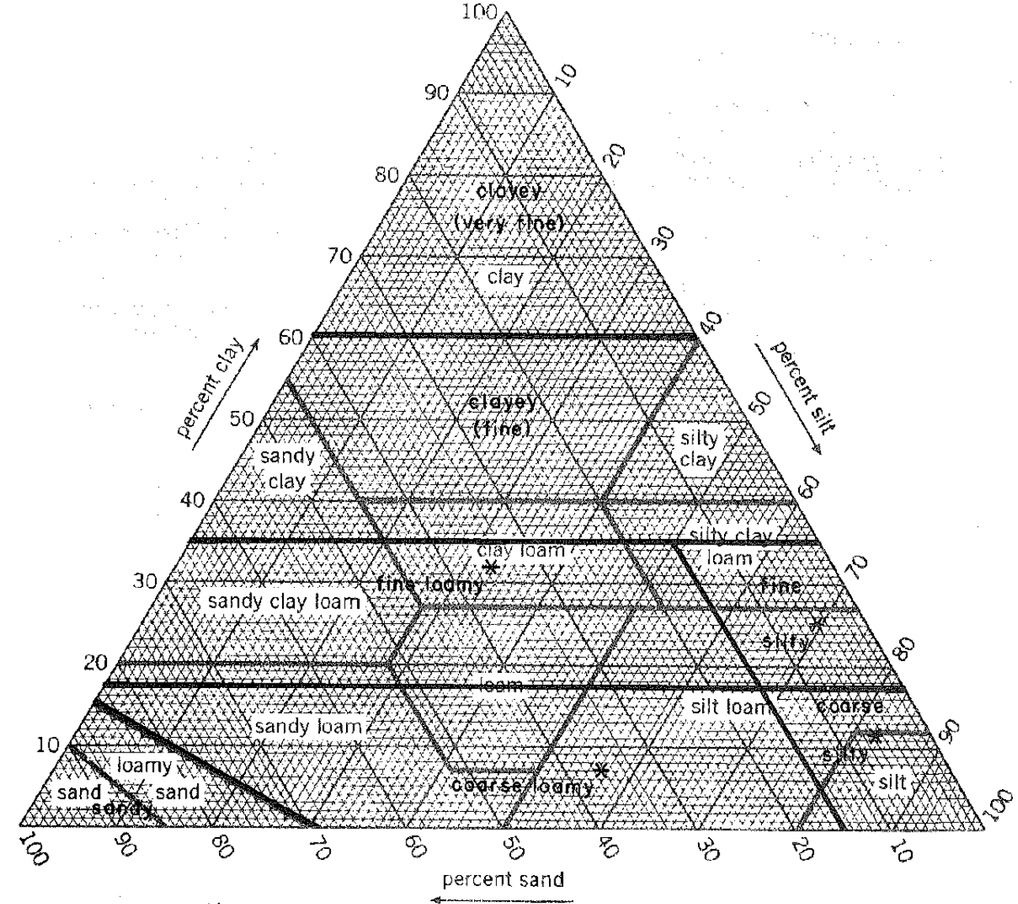
APPENDIX G

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOL	TYPICAL NAMES
Coarse-grained soils (More than half of material is larger than No. 200 sieve size)	Gravels—(More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
		Gravel with fines (Appreciable amount of fines)	GM* d / u	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravel, gravel-sand-clay mixtures
	Sands—(More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands, gravelly sands, little or no fines
		Sands with fines (Appreciable amount	SM* d / u	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
Fine-grained soils (More than half of material if smaller than No. 200 sieve)	Silts and Clays (Liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays (Liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
	Highly organic soils		PT	Peat and other highly organic soils

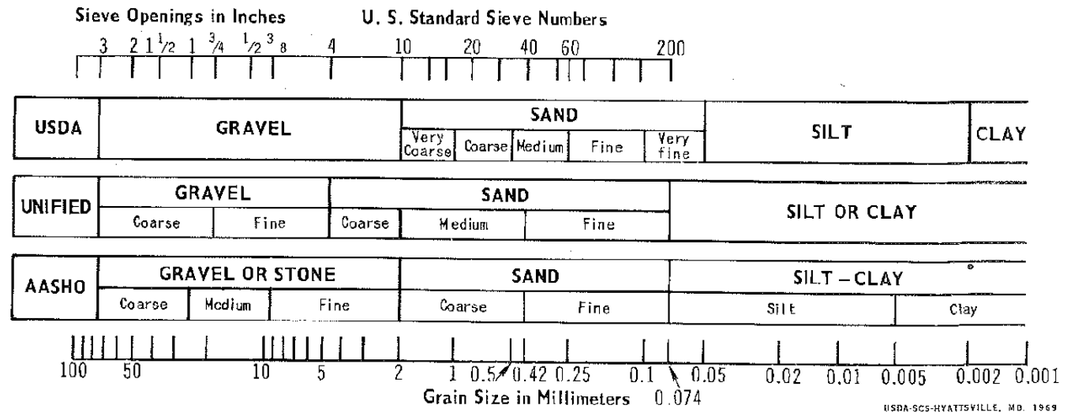
APPENDIX H

GUIDE FOR TEXTURAL CLASSIFICATION IN SOIL FAMILIES



* Very fine sand (0.05 – 0.1) is treated as silt for family groupings; coarse fragments are considered the equivalent of coarse sand in the boundary between the silty and loamy classes.

COMPARISON OF PARTICLE SIZE SCALES



USDA-SCS-HYATTSVILLE, MD. 1969

APPENDIX I

GLOSSARY

Aerial Logging - Logging systems using helicopters or balloons where logs are lifted vertically and yarded free and clear of the ground.

Alluvium - Material laid down in recent times in riverbeds, flood plains, and fans at the foot of mountains.

Andesite - A dark gray to black, dense, fine-grained extrusive igneous rock composed primarily of minerals such as plagioclase (andesine), biotite, hornblende, pyroxene, and quartz.

Ash - Uncemented volcanic ejecta less than 4.0 mm in diameter. Most of the volcanic ash is of a sand size on the Deschutes National Forest.

Basalt - A dark gray to black, dense, fine-grained extrusive igneous rock. Slightly less acid than andesite. It is composed primarily of calcic plagioclase and pyroxene, with or without olivine.

Breccia - A more or less indurated pyroclastic rock consisting chiefly of angular ejecta 32 mm or more in diameter, lying in a fine tuff matrix.

Caldera - A large, basin-shaped volcanic depression, more or less circular in form. Two basic types are from explosion or collapse.

Cinders - Primarily uncemented, glossy, and vesicular volcanic ejecta.

Cinder Cone - A conical elevation formed by the accumulation of cindery material around a vent.

Cirque Basin - A half-amphitheater formed by alpine glaciation with three steep sides. Usually found at upper ends of valleys and along ridges.

Clay - A soil separate less than .002 mm 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.

Cobble - A rock fragment between 3 and 10 inches in diameter.

Colluvium - Soil material or rock fragments moved downslope by gravitational force in the form of soil creep, slides, and local wash.

Compaction - The packing together of soil particles by forces exerted at the soil surface, resulting in increased soil density.

Complex - An association in which two or three mapping units or miscellaneous mapping units are so intricately mixed that it is not practical to show them separately at the scale of mapping used.

Composite Cone - A volcanic cone, usually of large dimension, built of alternating layers of lava and pyroclastic material.

Critical Soil - The term "critical soil" is frequently used by laymen, but it is a meaningless term unless it is related to a specific function. Many soils may be critical for one reason or another, but different soils may not be critical for the same reasons. For example, a deep, wet, plastic and unstable soil will be critical in relation to road location and stability. This soil is not critical in relation to regeneration and droughtiness problems. Another soil may be very shallow over hard bedrock. This soil is not critical from the standpoint of road stability, but may be critical as to regeneration problems resulting from droughtiness and low fertility. It may also be critical in relation to surface erosion. From these two examples, it becomes obvious that the term "critical soil" must be defined by the user in relation to its intended purpose.

Dacite - An extrusive volcanic rock. The principal minerals are plagioclase (andesine and oligoclase), quartz, pyroxene or horneblende, or both, with minor biotite and sanidine.

Debris Slide - A rapidly moving slide composed of soil, bedrock, or both.

Displacement - Soil displacement refers to the repositioning or removal of the surface soil layers by mechanical action.

Erosion - (1) The wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep; (2) detachment and movement of soil or rock fragments by water, wind, ice, or gravity. The following terms are used to describe different types of water erosion:

> Accelerated Erosion - Erosion much more rapid than normal, natural, or geologic erosion primarily as a result of the influence of the activities of man, or, in some cases, of other animals or natural catastrophies that expose base surfaces. For example - fires.
>
> Geological Erosion - The normal or natural erosion caused by geological processes acting over long geologic periods and resulting in the wearing away of mountains, the building up of flood plains, coastal plains, etc. Syn., natural erosion.
>
> Gully Erosion - The erosion process whereby water accumulates in narrow channels and, over short periods, removes the soil from this narrow area to considerable depths, ranging from 4 inches to as much as 75 to 100 feet.
>
> Natural Erosion - Wearing away of the earth's surface by water, ice, or other natural agents under natural environmental conditions of climate, vegetation, etc. undisturbed by man. Syn. geol. erosion.

Normal Erosion - The gradual erosion of land used by man which does not greatly exceed natural erosion. See natural erosion.

Rill Erosion - An erosion process in which numerous small channels less than 4 feet deep and 6 inches wide are formed.

Sheet Erosion - The removal of a fairly uniform layer of soil from the land surface by runoff water.

Splash Erosion - The spattering of small soil particles caused by the impact of raindrops on wet soils. The loosened and spattered particles may or may not be subsequently removed by surface runoff.

Evapotranspiration - Water transpired by vegetation plus that evaporated from the soil.

Extrusive Bedrock - This applies to those igneous rocks derived from volcanic lavas that cooled on the surface of the earth. This lava cools rapidly and forms fine-textured rocks such as basalt and andesite.

Fault - A fracture or fracture zone along which there has been displacement of the sides relative to one another parallel to the fracture.

Fault Escarpment - The steep slope along the face of a fault system.

Geomorphology - The study of landforms as they relate to geologic composition and history.

Glacial Outwash - Glacial material swept out, sorted, and deposited by water that originated from the melting of glacial ice.

Glacial Till - Glacial materials deposited directly by ice with little or no transportation by water. It is generally an unconsolidated, unstratified compact mixture of clay, silt, sand, gravel, and boulders.

Glaciofluvial Deposits - Soil materials that have been transported and deposited by glaciers and subsequently reworked by water.

Glaciolacustrine Deposits - Soil materials transported by glaciers and deposited by glacial meltwater in glacial lakes, ranging from fine sand and small gravel near the lakeshores to fine silts and clay in the lake bottom.

Glaciated Valley - U-shaped valley formerly occupied by a glacier.

Gravel - A rock fragment between 2.0 millimeters and 3 inches in diameter.

Hydrophobic - Lacking a strong affinity for water, water repellent.

Inclusion - Landtype found within a mapping unit that is not extensive enough to be mapped separately or as part of a complex.

Isohyetal Map - A map with lines along which all points receive the same amount of precipitation.

Landform - Structural configuration of the topography as a result of past and present geological activity.

Landtype - A land system with a designated soil, vegetation, geology, topography, climate, and drainage situation. The basic taxonomic unit in the Soil Resource Inventory.

Lapilli - Volcanic ejecta between 4 mm and 32 mm in diameter.

Lava Dome - Lava domes are masses of lava which have issued from central vents in the proper directions to build a dome-shaped pile of lava.

Lava Flow - A solidified mass of rock formed when a stream of viscous, molten rock from a volcano or fissure has cooled and congealed.

Mapping Unit - Any delineated area shown on a soil map that is identified by a number or letter code. A mapping unit may be a regular landtype, a miscellaneous landtype, or a complex.

Massive - Soil structure or bedrock condition in which there is no observable aggregation or no definite orderly arrangement of natural lines of weakness.

Mass Movement - All movement of soil and bedrock materials occurring below the soil surface such as landslips, landflows, rock slides, slumps, etc.

Miscellaneous Landtypes - A mapping unit for areas of land that have little or no natural soil or have properties that are too variable and unpredictable for classification.

Mixed Conifers - This term is used for a mixture of coniferous species which may include ponderosa pine, white fir, Douglas-fir, white pine, lodgepole pine, sugar pine, larch, shasta red fir, and incense cedar. It is not used in this report for types associated with mountain hemlock.

Physiographic Divisions - Broad groupings based on the physical features of the landscape.

Plastic Soil - A soil capable of being molded or deformed continuously and permanently, by relatively moderate pressure into various shapes.

Principal Forest Zone - A term used for a natural resource zone upon which the main timber management activities occur. It is below the mountain hemlock type and includes primarily ponderosa pine and associated species and the lower elevation lodgepole pine.

Puddling and Puddled - The act of destroying soil structure by manipulating a soil when it is in a wet and plastic condition. Puddling reduces porosity and permeability.

Pumice - An excessively cellular, light-colored, volcanic ejecta.

Pumiceous - Containing pumice properties. Pumiceous volcanic ash is pumice material that is less than 4 mm in diameter.

Pyroclastic - A general term applied to rocks formed from volcanic material that has been explosively or aerially ejected from a volcanic vent.

Rhyolite - A light-colored, fine-grained, acidic, extrusive rock.

Residuum - Soil material formed by rock weathering in place.

Ravel - The falling down of individual particles along a slope by gravitational force.

Runoff - That part of the precipitation which appears in surface streams or either perennial or intermittent form.

Sand - A soil separate between .05 and 2.0 millimeters in diameter.

Sedimentary Rock - Rock formed by deposition of soil and rock particles by water, ice, or wind that later solidifies through cementation, ionic exchange or compression.

Silt - A soil separate consisting of particles between 0.002 and 0.05 millimeters in diameter.

Slump - A deep-seated, slow-moving rotational failure occurring in plastic materials, resulting in vertical and lateral displacement.

Soil - Naturally occurring, loose, incoherent, unconsolidated weathered material on the earth's surface resting on solid, consolidated, unweathered bedrock, no matter how formed, or origin, or method of weathering or deposition. Generally includes any material that may be moved or broken by hand tools or heavy equipment without the need of blasting except soft, unweathered bedrock. In soil horizon designation, soil materials included "A," "B," and "C," horizons.

Soil Creep - Slow mass movement of soil materials down slopes primarily under the influence of gravity, but facilitated by saturation with water and/or by alternating freezing and thawing.

Spot Symbols - Symbols used on soil maps to represent a landscape factor too small to delineate.

Stone - A rock fragment greater than 10 inches in diameter.

Surface Slips - Rapid movement downslope of the surface few feet of soil on steep slopes.

Toeslope - That portion of a slope that is transitional between the valley floor and the upper slope.

Topography - The relief features or surface configuration of an area.

Tuff - A rock formed of compacted volcanic fragments, generally smaller than 4 mm in diameter.

Upper Forest - A resource zone generally identified with the mountain hemlock forest type.

U-shaped Valley - Descriptive phrase of the cross profile of a valley which has been carved out by glacial movement.

Volcanic Ejecta - Any and all material forcibly blown out of volcanic cones, fissures, and vents.

V-shaped Valley - A descriptive phrase of the cross profile of a valley which has been cut by stream action.

Welded Tuff - A tuff that has been indurated by the combined action of the heat retained by the particles and the enveloping hot gases.

APPENDIX J

This section contains soil maps similar to those in the Atlas of Soil Maps, only they have been reduced to a scale of about a half-inch/mile. These maps can be used as a reference if the Atlas of Soil Maps is not available or if a less detailed map scale is suitable.

DESCHUTES NATIONAL FOREST

Soil Resource Inventory

Soil Map U.S.F.S. R-6, 1976

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
MT. HOOD-WILLAMETTE-DESCHUTES NATIONAL FORESTS

MT. JEFFERSON, QUADRANGLE
OREGON



Soil mapping by U.S.F.S. Soil Scientists Daniel M. Larsen and Robert A. Klink, Deschutes National Forest.
Mapping units are described in the Soil Resource Inventory Report.

- ROCK OUTCROP
- T TALUS
- X UNSTABLE AREA
- WET SPOT, SMALL MARSH OR POND
- AVALANCHE TRACK OR DEBRIS SLIDE
- FAULT ESCARPMENT, ROCK CLIFF
- CRATER
- GRAVEL OR CINDER PIT
- SANDSPOT, SAND BLOWOUT
- F SMALL FROST POCKET
- SLUMP OR SLIDE ESCARPMENT, CIRQUE HEADWALL

DESCHUTES NATIONAL FOREST

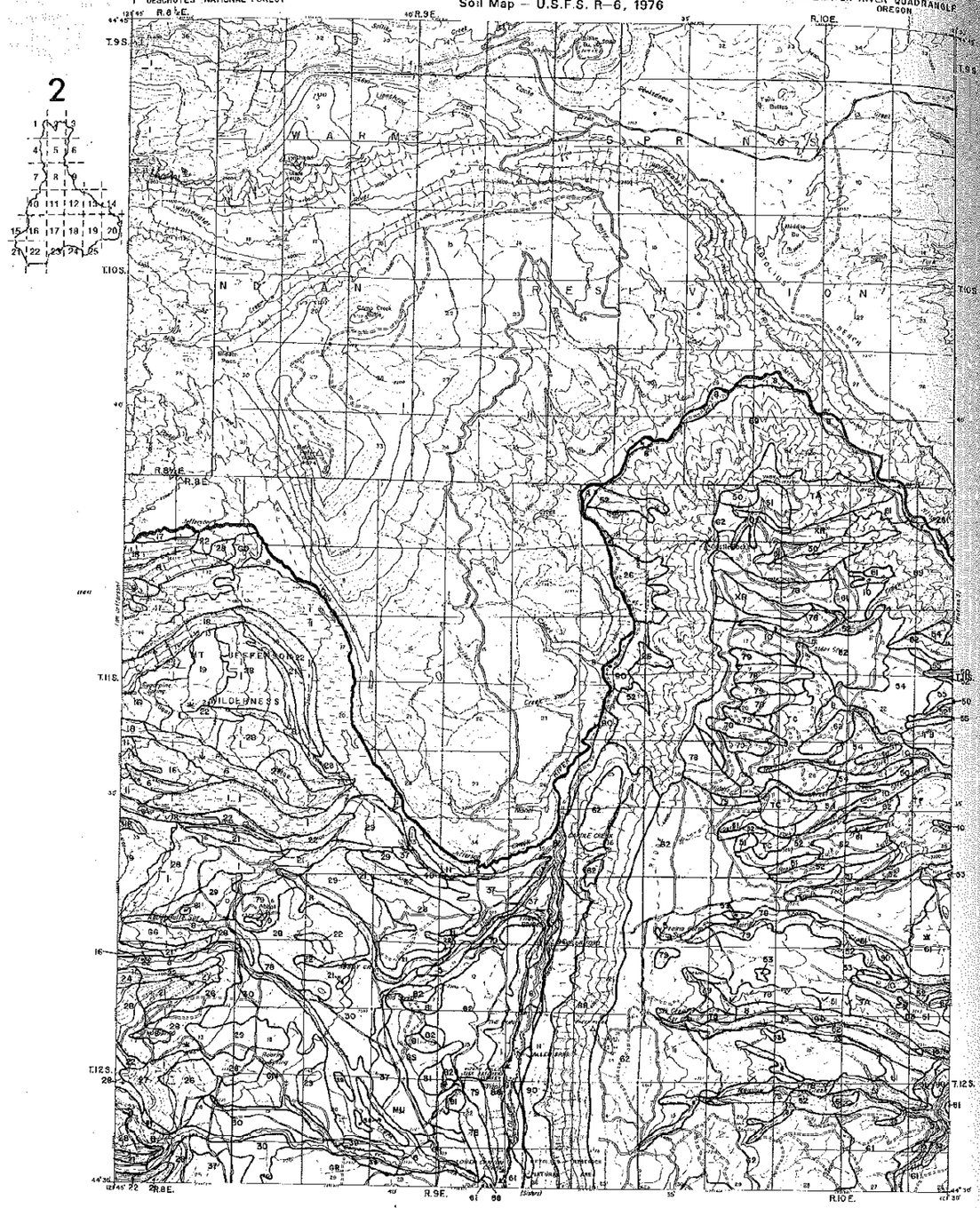
Soil Resource Inventory

Soil Map — U.S.F.S. R–6, 1976

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
DESCHUTES NATIONAL FOREST

WHITEWATER RIVER QUADRANGLE
OREGON

2



Soil mapping by U.S.F.S. Soil Scientists Daniel M. Larsen and Robert A. Klink, Deschutes National Forest.
Mapping units are described in the Soil Resource Inventory Report.

- ROCK OUTCROP
- T TALUS
- X UNSTABLE AREA
- WET SPOT, SMALL MARSH OR POND
- AVALANCHE TRACK OR DEBRIS SLIDE
- FAULT ESCARPMENT, ROCK CLIFF
- CRATER
- GRAVEL OR CINDER PIT
- SANDSPOT, SAND BLOWOUT
- F SMALL FROST POCKET
- SLUMP OR SLIDE ESCARPMENT, CIRQUE HEADWALL

DESCHUTES NATIONAL FOREST

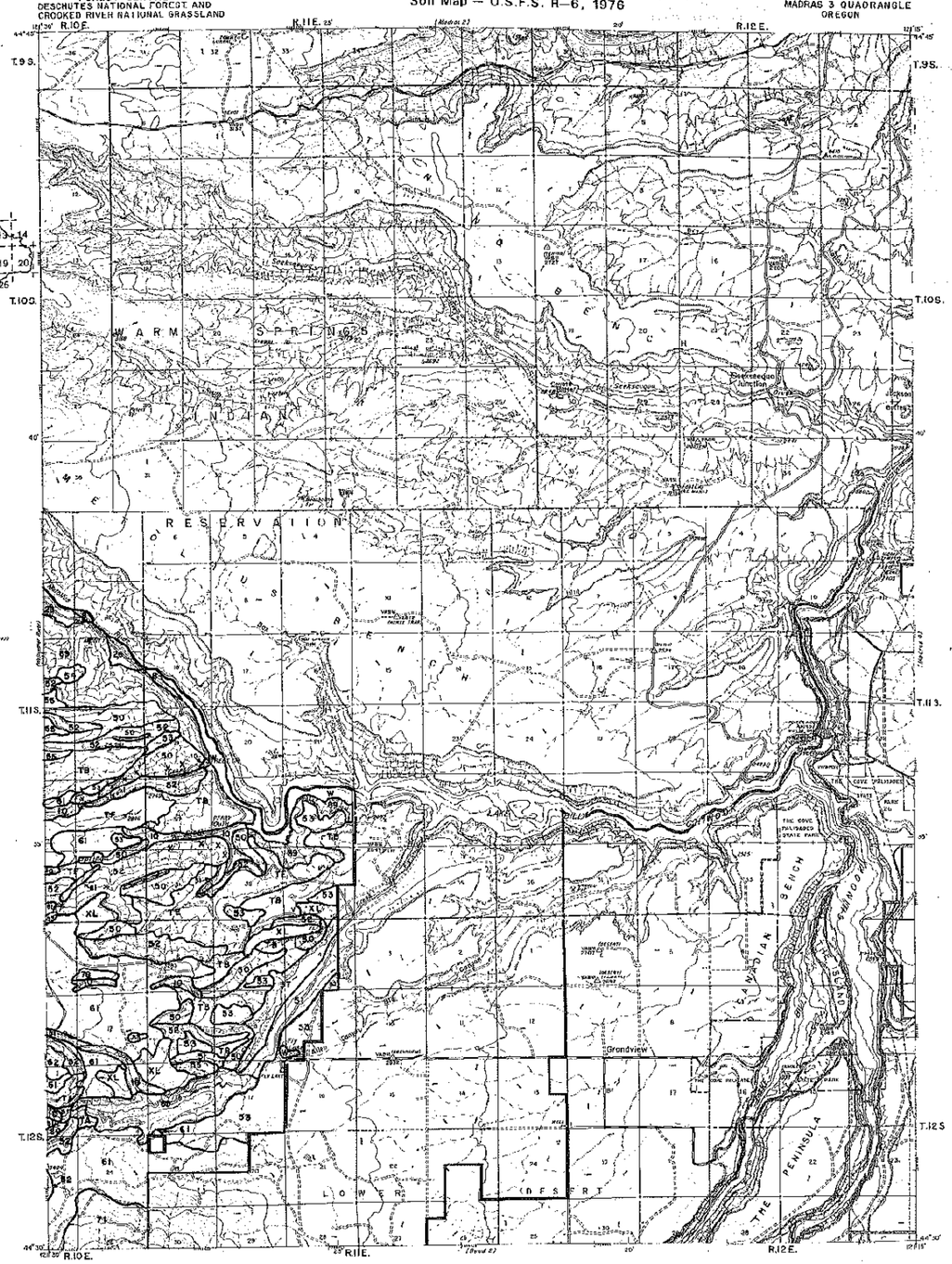
Soil Resource Inventory

Soil Map — U.S.F.S. R–6, 1976

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
DESCHUTES NATIONAL FOREST AND
CROOKED RIVER NATIONAL GRASSLAND

MADRAS 3 QUADRANGLE
OREGON

3



Soil mapping by U.S.F.S. Soil Scientists Daniel M. Larsen and Robert A. Klink, Deschutes National Forest.
Mapping units are described in the Soil Resource Inventory Report.

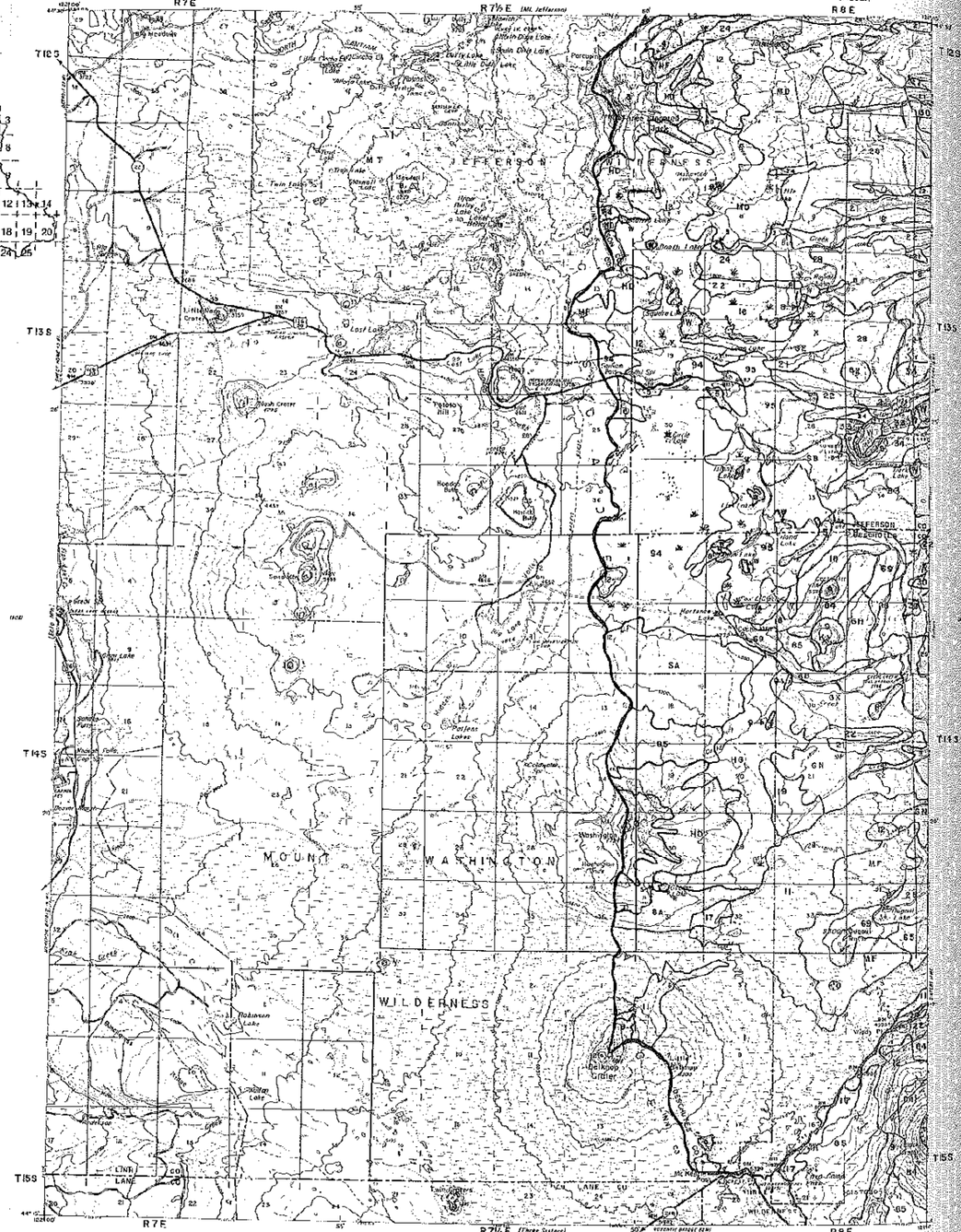
- ROCK OUTCROP
- T TALUS
- X UNSTABLE AREA
- WET SPOT, SMALL MARSH OR POND
- AVALANCHE TRACK OR DEBRIS SLIDE
- FAULT ESCARPMENT, ROCK CLIFF
- CRATER
- GRAVEL OR CINDER PIT
- SANDSPOT, SAND BLOWOUT
- F SMALL FROST POCKET
- SLUMP OR SLIDE ESCARPMENT, CIRQUE HEADWALL

DESCHUTES NATIONAL FOREST
Soil Resource Inventory
Soil Map — U.S.F.S. R-6, 1976

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
WILLAMETTE-DESCHUTES NATIONAL FORESTS

THREE FINGERED JACK QUADRANGLE
OREGON

4



Soil mapping by U.S.F.S. Soil Scientists Daniel M. Larsen and Robert A. Klink, Deschutes National Forest.
Mapping units are described in the Soil Resource Inventory Report.

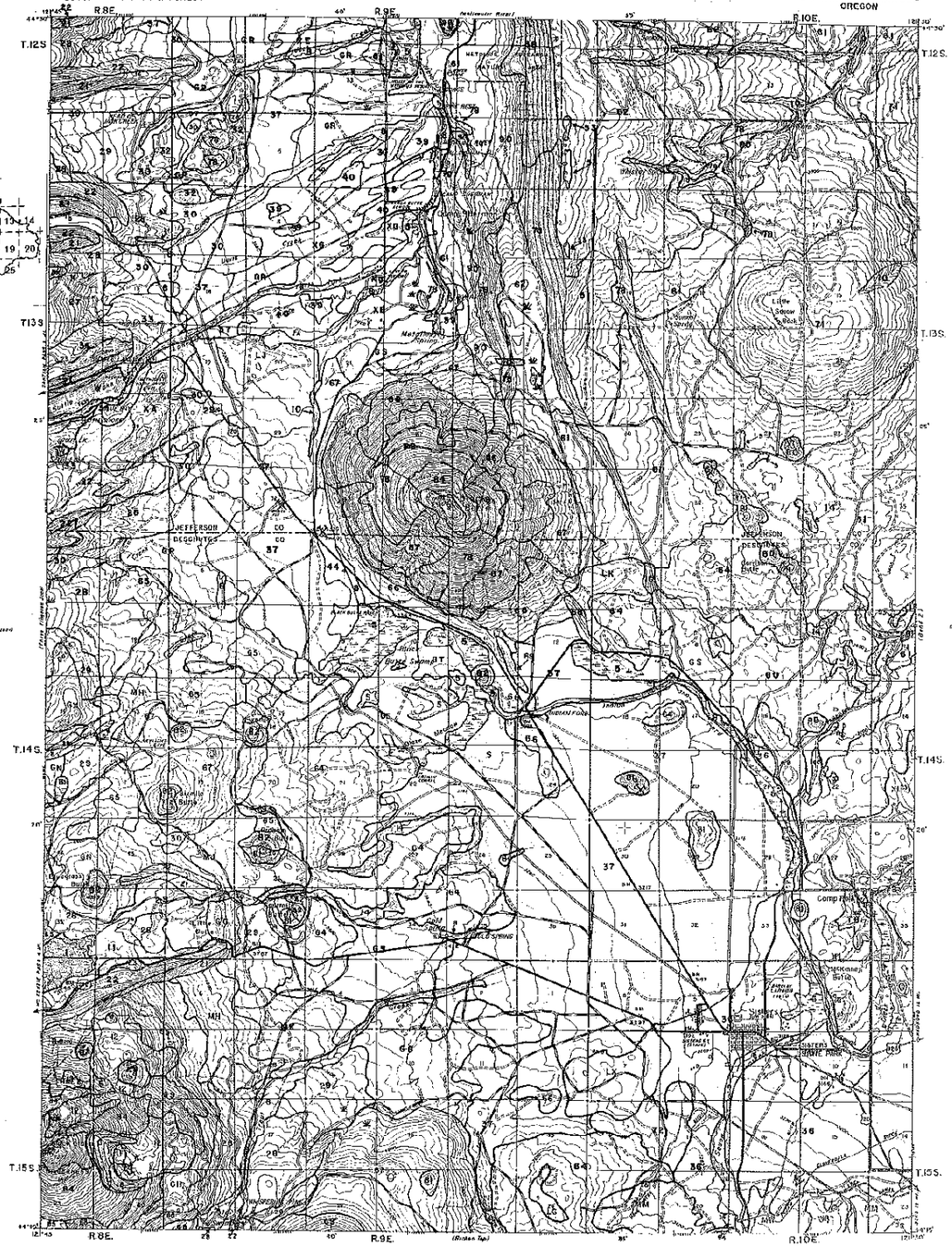
- ROCK OUTCROP
- TALUS
- UNSTABLE AREA
- WET SPOT, SMALL MARSH OR POND
- AVALANCHE TRACK OR DEBRIS SLIDE
- FAULT ESCARPMENT, ROCK CLIFF
- CRATER
- GRAVEL OR CINDER PIT
- SANDSPOT, SAND BLOWOUT
- SMALL FROST POCKET
- SLUMP OR SLIDE ESCARPMENT, CIRQUE HEADWALL

DESCHUTES NATIONAL FOREST
Soil Resource Inventory
Soil Map — U.S.F.S. R-6, 1976

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
DESCHUTES NATIONAL FOREST

SISTERS QUADRANGLE
OREGON

5


R8E.
R9E.
R10E.
T12S.
T13S.
T14S.
T15S.
JEFFERSON CO
DESCHUTES CO
Black Butte
Camp Polk
Squaw Ridge Lookout
Little Squaw Back
Squaw Peak
Squaw Peak Trail
Pole Creek
Pole Creek Trail
Pole Creek Lookout
Pole Creek Mountain
Pole Creek Mountain Trail
Pole Creek Mountain Lookout
Pole Creek Mountain Lookout Trail
Pole Creek Mountain Lookout Trail
Pole Creek Mountain Lookout Trail

DESCHUTES NATIONAL FOREST

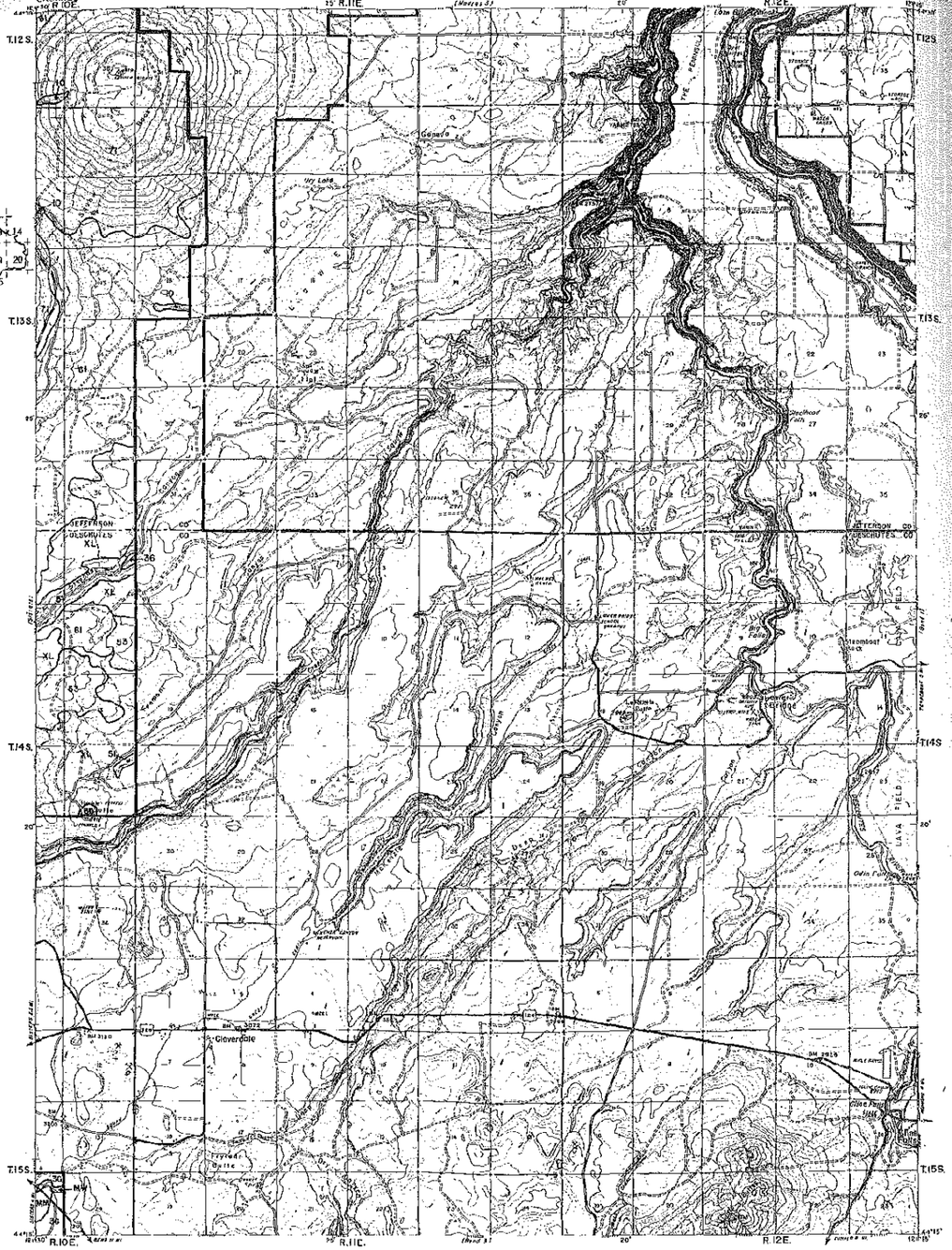
Soil Resource Inventory

Soil Map — U.S.F.S. R–6, 1976

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
DESCHUTES NATIONAL FOREST AND
CROOKED RIVER NATIONAL GRASSLAND

BEND 2 QUADRANGLE
OREGON

6



DESCHUTES NATIONAL FOREST
Soil Resource Inventory
Soil Map — U.S.F.S. R–6, 1976

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
DESCHUTES NATIONAL FOREST

BROKEN TOP QUADRANGLE
OREGON

8

R.8E. R.9E. R.10E.

T.15S.
T.16S.
T.17S.
T.18S.

THREE SISTERS WILDERNESS

Soil mapping by U.S.F.S. Soil Scientists Daniel M. Larsen and Robert A. Klink, Deschutes National Forest.
Mapping units are described in the Soil Resource Inventory Report.

- ROCK OUTCROP
- TALUS
- UNSTABLE AREA
- WET SPOT, SMALL MARSH OR POND
- AVALANCHE TRACK OR DEBRIS SLIDE
- FAULT ESCARPMENT, ROCK CLIFF
- CRATER
- GRAVEL OR CINDER PIT
- SANDSPOT, SAND BLOWOUT
- SMALL FROST POCKET
- SLUMP OR SLIDE ESCARPMENT, CIRQUE HEADWALL

DESCHUTES NATIONAL FOREST
Soil Resource Inventory
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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
DESCHUTES NATIONAL FOREST

BEND 3 QUADRANGLE
OREGON

9

R.10E. R.11E. R.12E.

T.15S.
T.16S.
T.17S.
T.18S.

Soil mapping by U.S.F.S. Soil Scientists Daniel M. Larsen and Robert A. Klink, Deschutes National Forest.
Mapping units are described in the Soil Resource Inventory Report.

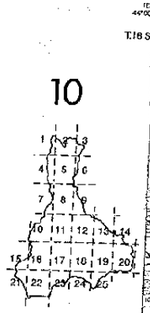
- ROCK OUTCROP
- TALUS
- UNSTABLE AREA
- WET SPOT, SMALL MARSH OR POND
- AVALANCHE TRACK OR DEBRIS SLIDE
- FAULT ESCARPMENT, ROCK CLIFF
- CRATER
- GRAVEL OR CINDER PIT
- SANDSPOT, SAND BLOWOUT
- SMALL FROST POCKET
- SLUMP OR SLIDE ESCARPMENT, CIRQUE HEADWALL

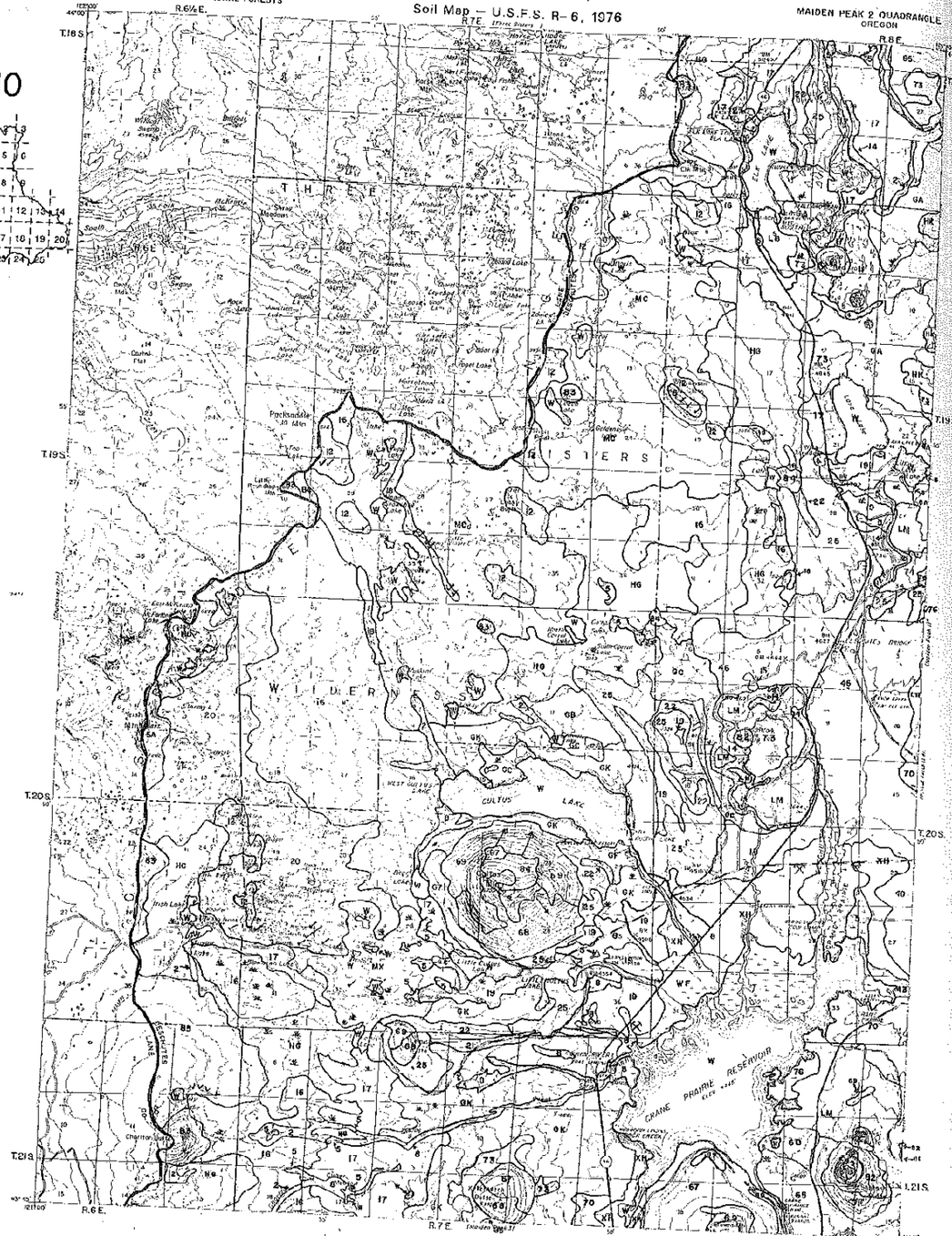
DESCHUTES NATIONAL FOREST
Soil Resource Inventory
Soil Map — U.S.F.S. R–6, 1976

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
WILLAMETTE–DESCHUTES NATIONAL FORESTS

MAIDEN PEAK 2 QUADRANGLE
OREGON

10





Soil mapping by U.S.F.S. Soil Scientists Daniel M. Larsen and Robert A. Klink, Deschutes National Forest.
Mapping units are described in the Soil Resource Inventory Report.

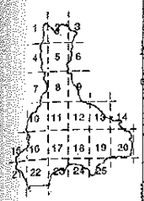
- ROCK OUTCROP
- T TALUS
- X UNSTABLE AREA
- WET SPOT, SMALL MARSH OR POND
- AVALANCHE TRACK OR DEBRIS SLIDE
- FAULT ESCARPMENT, ROCK CLIFF
- CRATER
- GRAVEL OR CINDER PIT
- SANDSPOT, SAND BLOWOUT
- F SMALL FROST POCKET
- SLUMP OR SLIDE ESCARPMENT, CIRQUE HEADWALL

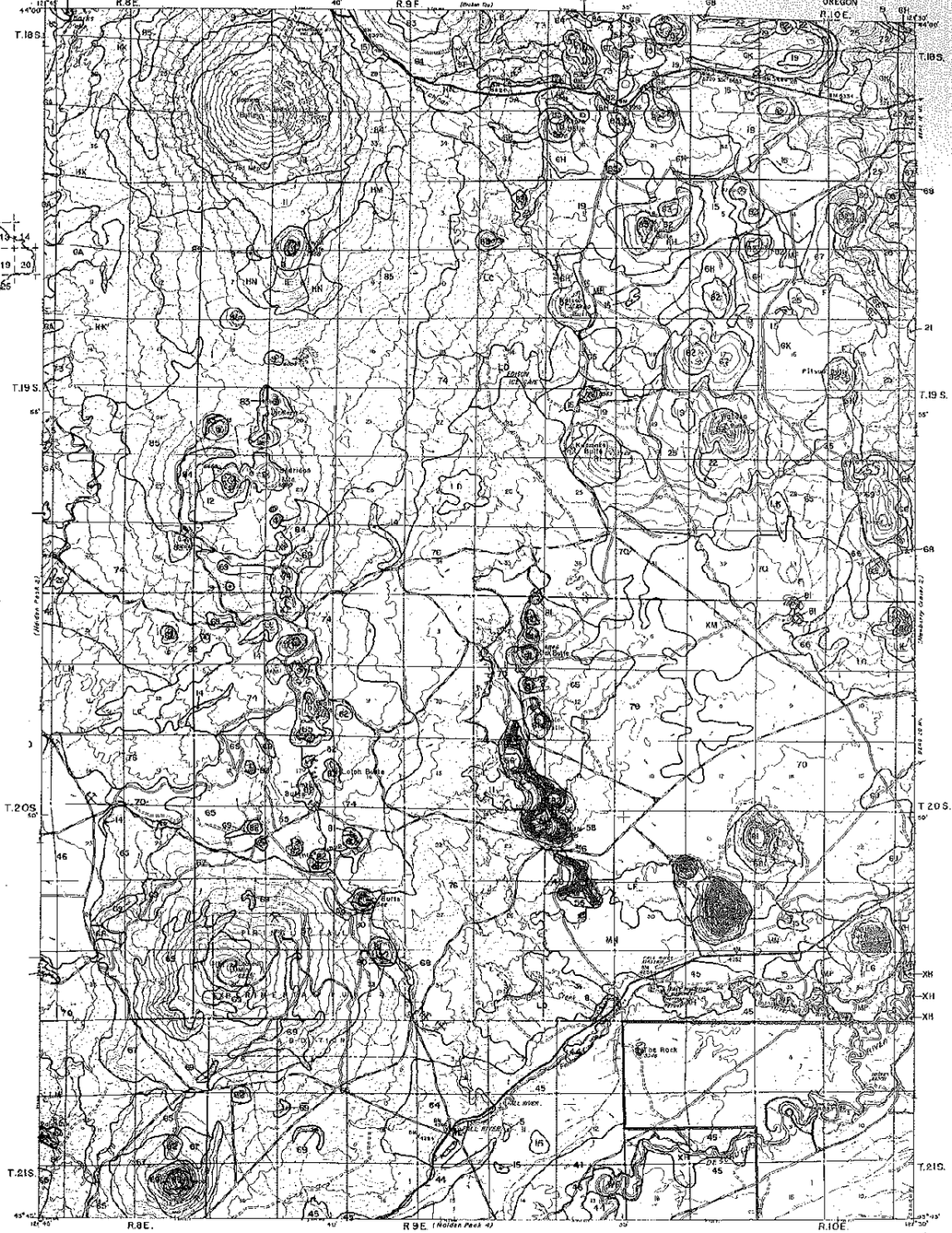
DESCHUTES NATIONAL FOREST
Soil Resource Inventory
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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
DESCHUTES NATIONAL FOREST

MAIDEN PEAK 1 QUADRANGLE
OREGON

11





Soil mapping by U.S.F.S. Soil Scientists Daniel M. Larsen and Robert A. Klink, Deschutes National Forest.
Mapping units are described in the Soil Resource Inventory Report.

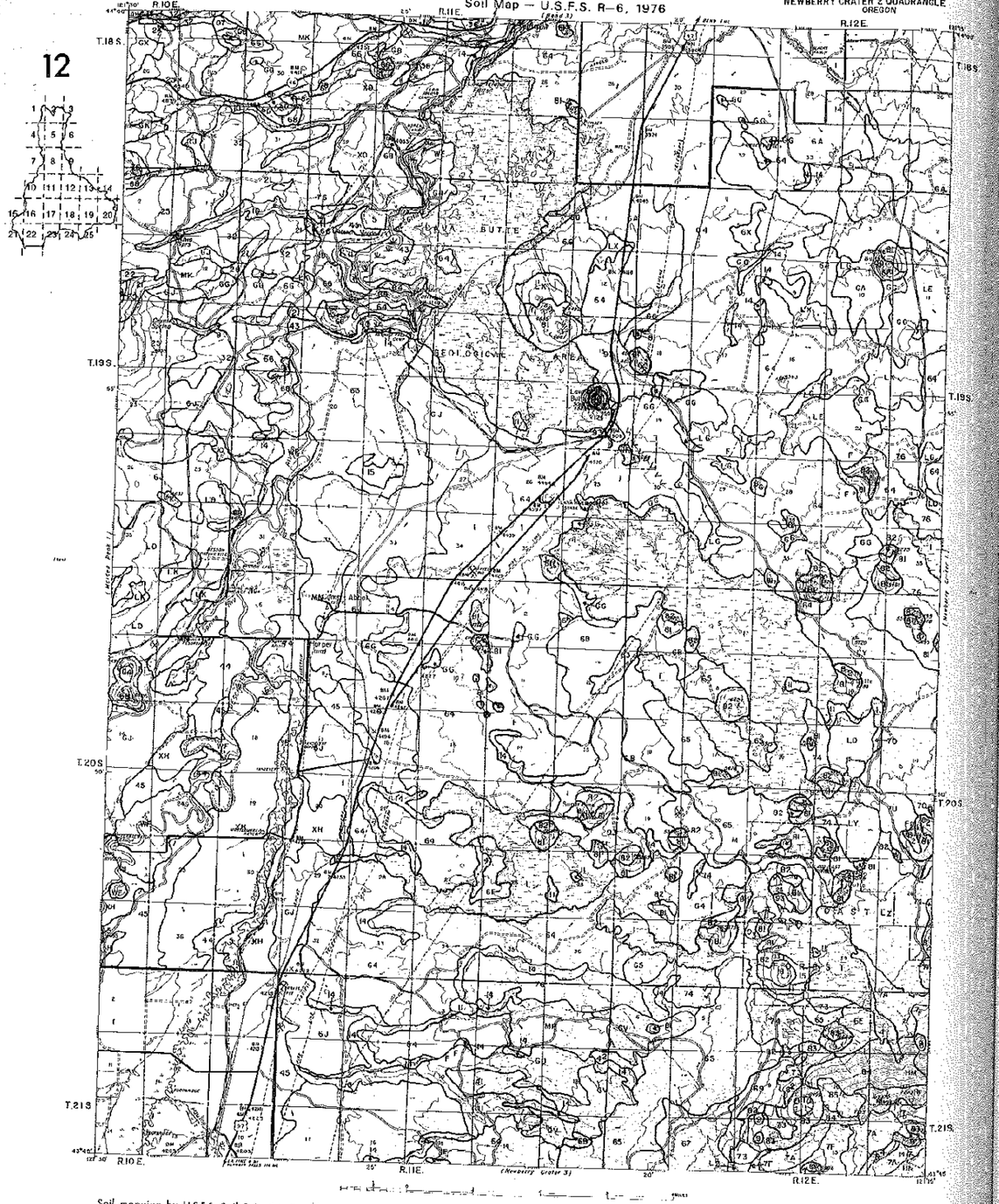
- ROCK OUTCROP
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- X UNSTABLE AREA
- WET SPOT, SMALL MARSH OR POND
- AVALANCHE TRACK OR DEBRIS SLIDE
- FAULT ESCARPMENT, ROCK CLIFF
- CRATER
- GRAVEL OR CINDER PIT
- SANDSPOT, SAND BLOWOUT
- F SMALL FROST POCKET
- SLUMP OR SLIDE ESCARPMENT, CIRQUE HEADWALL

DESCHUTES NATIONAL FOREST
Soil Resource Inventory
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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
DESCHUTES NATIONAL FOREST

NEWBERRY CRATER 2 QUADRANGLE
OREGON

12



Soil mapping by U.S.F.S. Soil Scientists Daniel M. Larsen and Robert A. Klink, Deschutes National Forest.
Mapping units are described in the Soil Resource Inventory Report.

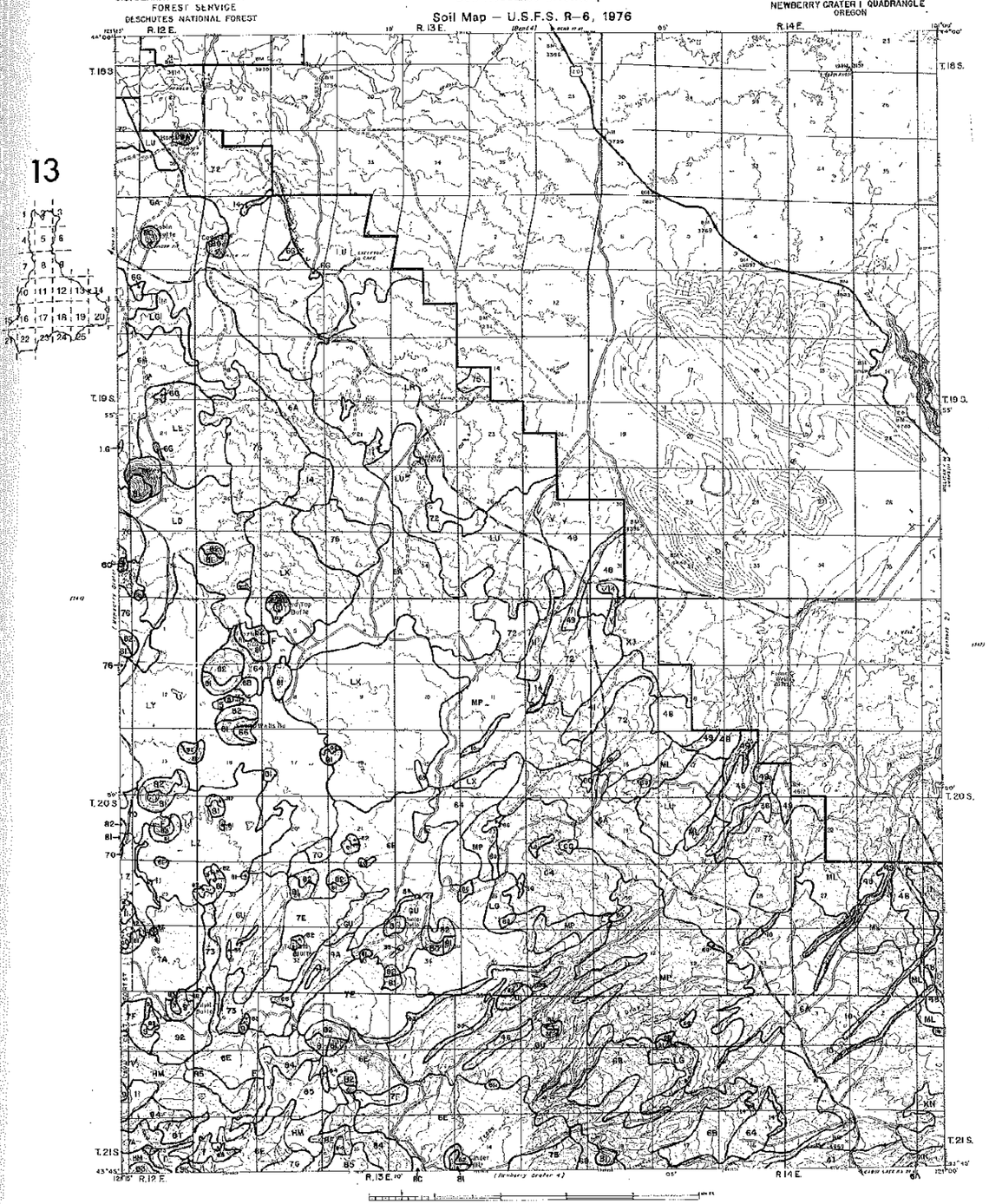
- ROCK OUTCROP
- T TALUS
- X UNSTABLE AREA
- WET SPOT, SMALL MARSH OR POND
- AVALANCHE TRACK OR DEBRIS SLIDE
- FAULT ESCARPMENT, ROCK CLIFF
- CRATER
- GRAVEL OR CINDER PIT
- SANDSPOT, SAND BLOWOUT
- F SMALL FROST POCKET
- SLUMP OR SLIDE ESCARPMENT, CIRQUE HEADWALL

DESCHUTES NATIONAL FOREST
Soil Resource Inventory
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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
DESCHUTES NATIONAL FOREST

NEWBERRY CRATER 1 QUADRANGLE
OREGON

13



Soil mapping by U.S.F.S. Soil Scientists Daniel M. Larsen and Robert A. Klink, Deschutes National Forest.
Mapping units are described in the Soil Resource Inventory Report.

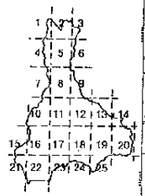
- ROCK OUTCROP
- T TALUS
- X UNSTABLE AREA
- WET SPOT, SMALL MARSH OR POND
- AVALANCHE TRACK OR DEBRIS SLIDE
- FAULT ESCARPMENT, ROCK CLIFF
- CRATER
- GRAVEL OR CINDER PIT
- SANDSPOT, SAND BLOWOUT
- F SMALL FROST POCKET
- SLUMP OR SLIDE ESCARPMENT, CIRQUE HEADWALL

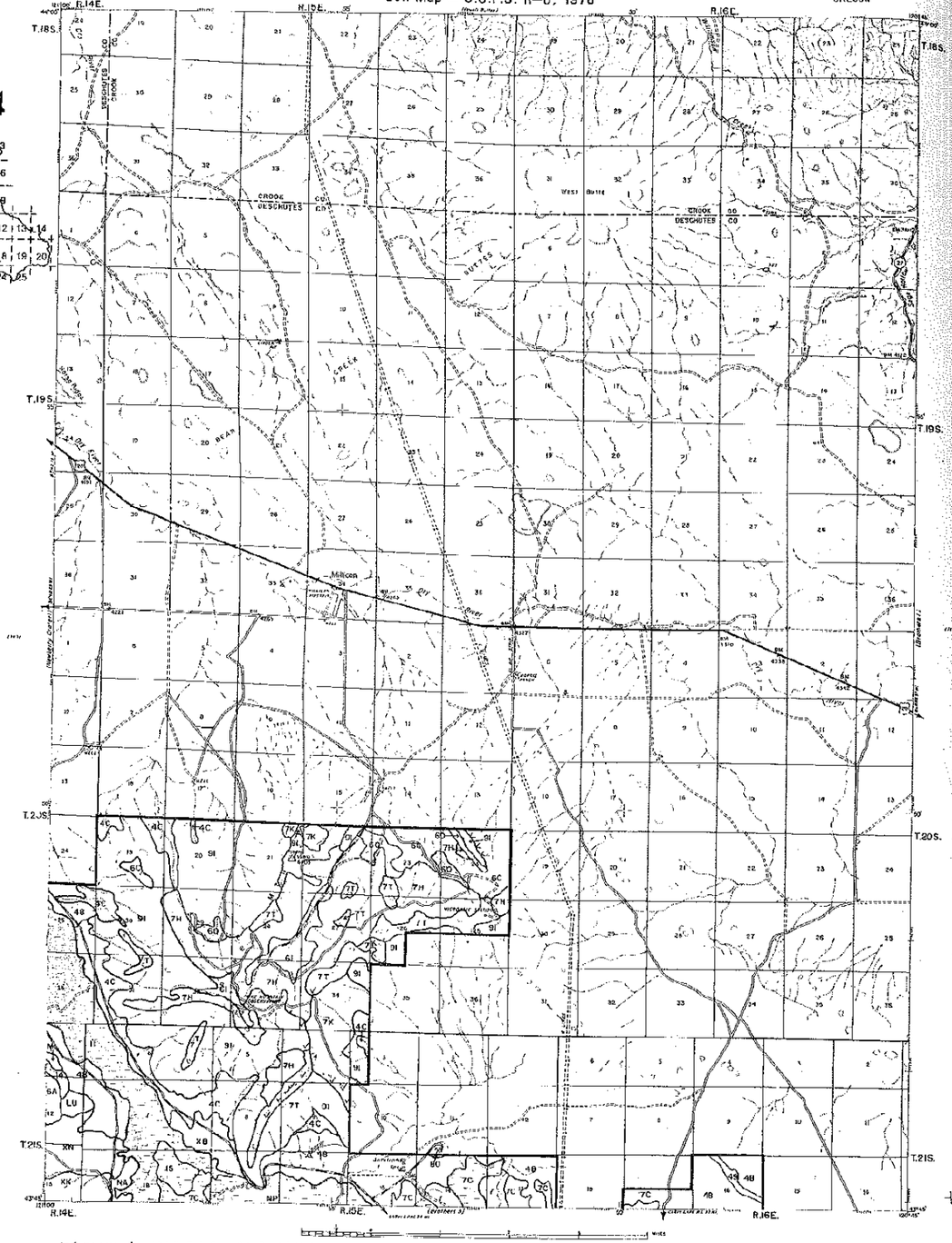
DESCHUTES NATIONAL FOREST
Soil Resource Inventory
Soil Map — U.S.F.S. R–6, 1976

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
DESCHUTES NATIONAL FOREST

BROTHERS 2 QUADRANGLE
OREGON

14



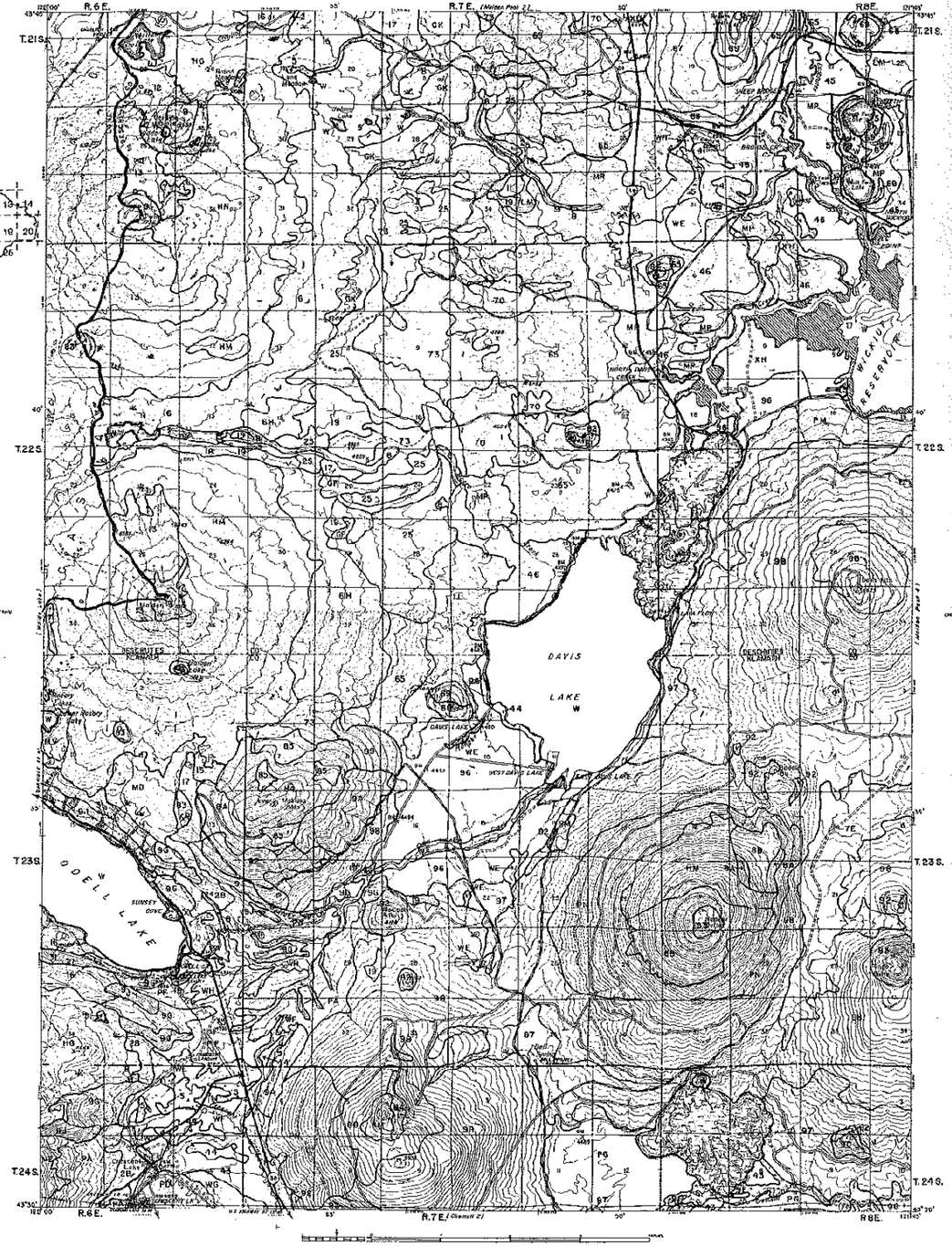

R.14E.
R.15E.
R.16E.
T.18S.
T.19S.
T.20S.
T.21S.
CROOK CO
DESCHUTES CO
DESCHUTES
CROOK
Millcon
Old Camp
Old Camp
Old Camp

DESCHUTES NATIONAL FOREST
Soil Resource Inventory
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U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
DESCHUTES-WILLAMETTE NATIONAL FORESTS

MAIDEN PEAK 3 QUADRANGLE
OREGON

16



Soil mapping by U.S.F.S. Soil Scientists Daniel M. Larsen and Robert A. Klink, Deschutes National Forest.
Mapping units are described in the Soil Resource Inventory Report.

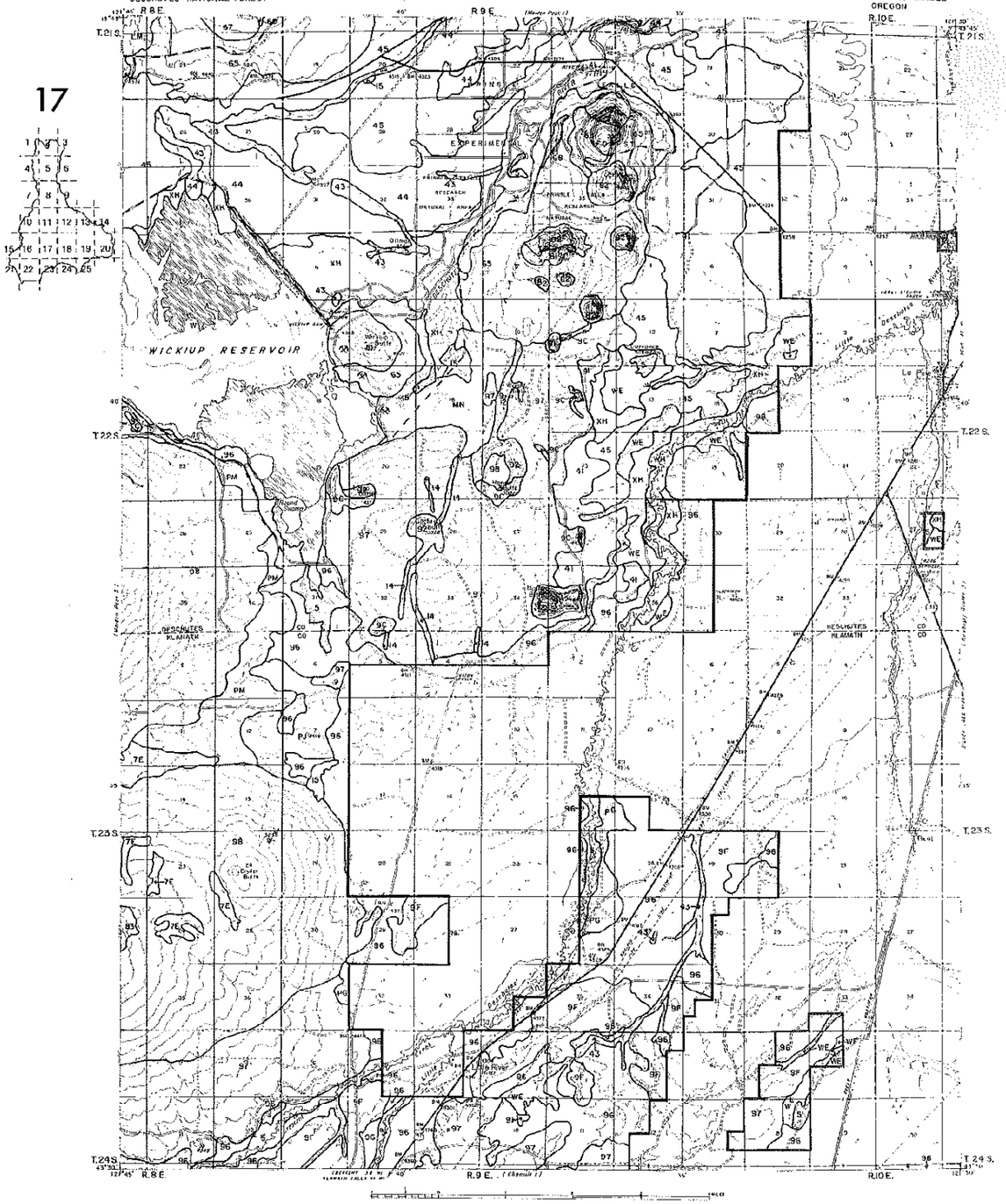
- ROCK OUTCROP
- TALUS
- X UNSTABLE AREA
- WET SPOT, SMALL MARSH OR POND
- AVALANCHE TRACK OR DEBRIS SLIDE
- FAULT ESCARPMENT, ROCK CLIFF
- CRATER
- GRAVEL OR CINDER PIT
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- SMALL FROST POCKET
- SLUMP OR SLIDE ESCARPMENT, CIRQUE HEADWALL

DESCHUTES NATIONAL FOREST
Soil Resource Inventory
Soil Map — U.S.F.S. R–6, 1976

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
DESCHUTES NATIONAL FOREST

MAIDEN PEAK 4 QUADRANGLE
OREGON

17



Soil mapping by U.S.F.S. Soil Scientists Daniel M. Larsen and Robert A. Klink, Deschutes National Forest.
Mapping units are described in the Soil Resource Inventory Report.

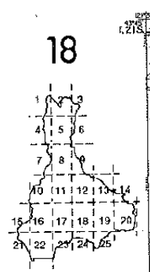
- ROCK OUTCROP
- TALUS
- X UNSTABLE AREA
- WET SPOT, SMALL MARSH OR POND
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- CRATER
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- SANDSPOT, SAND BLOWOUT
- SMALL FROST POCKET
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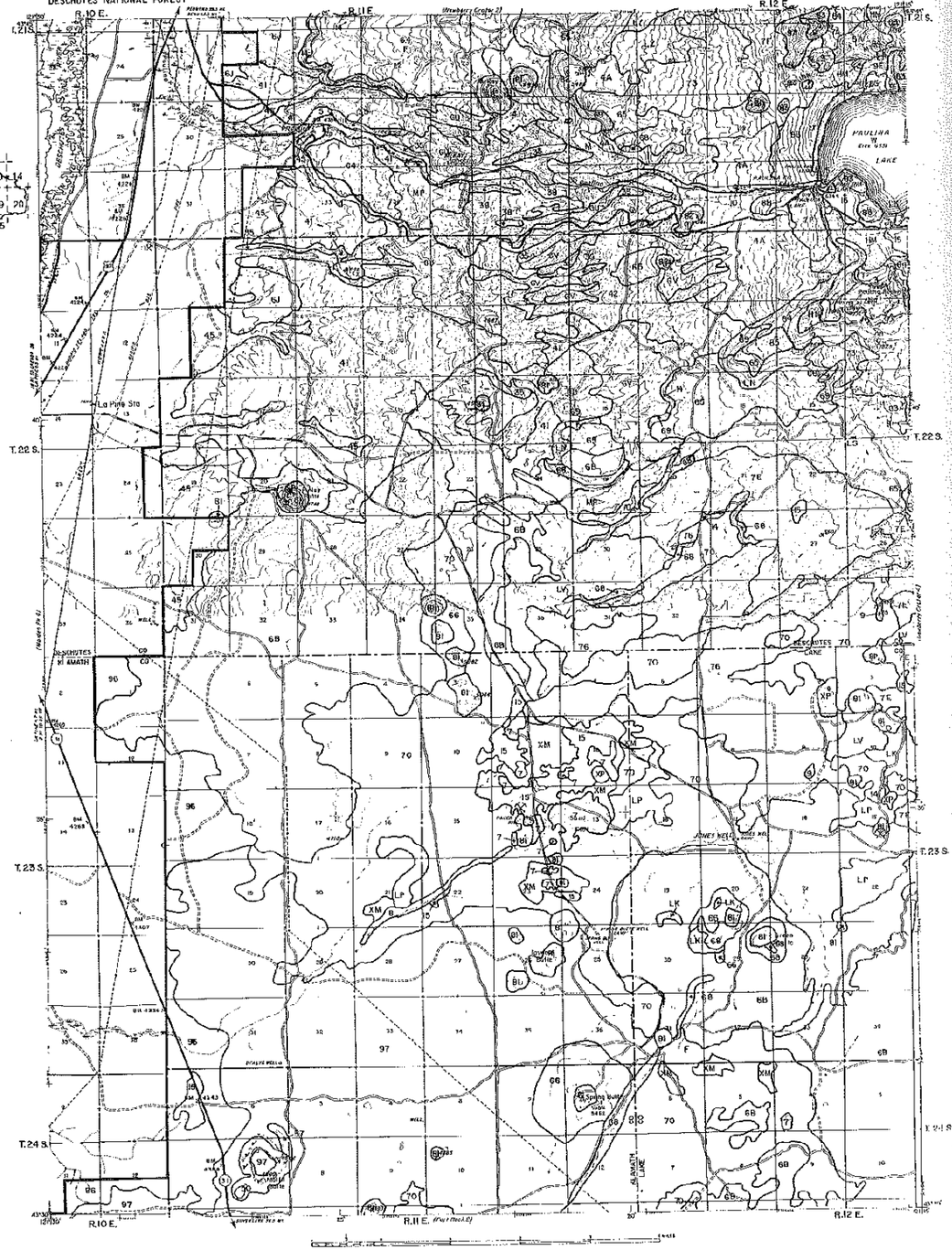
DESCHUTES NATIONAL FOREST
Soil Resource Inventory
Soil Map — U.S.F.S. R–6, 1976

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
DESCHUTES NATIONAL FOREST

NEWBERRY CRATER 3 QUADRANGLE
OREGON

18





Soil mapping by U.S.F.S. Soil Scientists Daniel M. Larsen
and Robert A. Klink, Deschutes National Forest.
Mapping units are described in the Soil Resource Inventory Report.

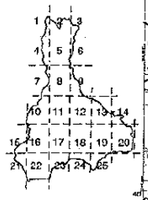
- ROCK OUTCROP
- T TALUS
- X UNSTABLE AREA
- WET SPOT, SMALL MARSH OR POND
- AVALANCHE TRACK OR DEBRIS SLIDE
- FAULT ESCARPMENT, ROCK CLIFF
- CRATER
- GRAVEL OR CINDER PIT
- SANDSPOT, SAND BLOWOUT
- F SMALL FROST POCKET
- SLUMP OR SLIDE ESCARPMENT, CIRQUE HEADWALL

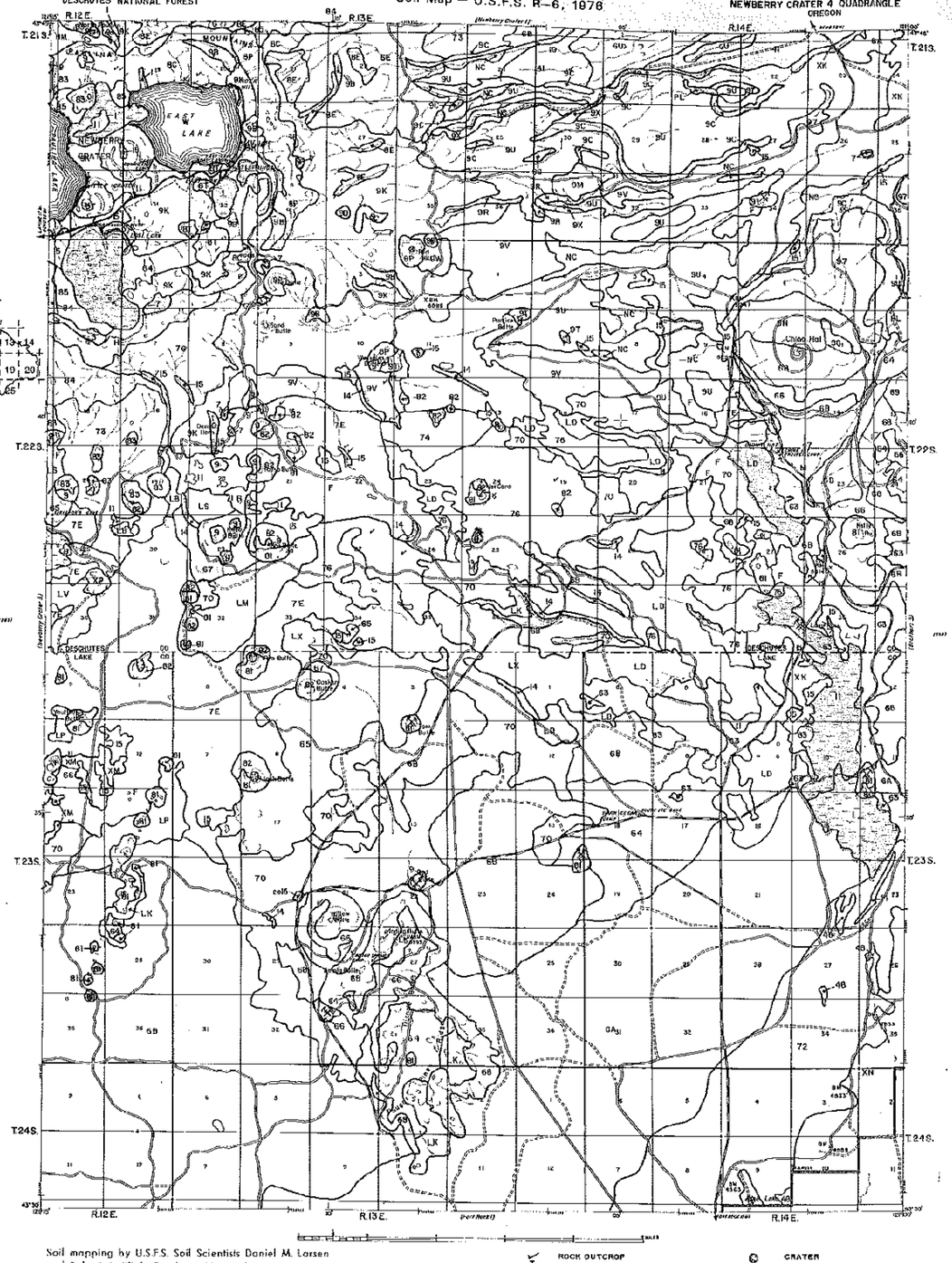
DESCHUTES NATIONAL FOREST
Soil Resource Inventory
Soil Map — U.S.F.S. R–6, 1976

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
DESCHUTES NATIONAL FOREST

NEWBERRY CRATER 4 QUADRANGLE
OREGON

19





Soil mapping by U.S.F.S. Soil Scientists Daniel M. Larsen
and Robert A. Klink, Deschutes National Forest.
Mapping units are described in the Soil Resource Inventory Report.

- ROCK OUTCROP
- T TALUS
- X UNSTABLE AREA
- WET SPOT, SMALL MARSH OR POND
- AVALANCHE TRACK OR DEBRIS SLIDE
- FAULT ESCARPMENT, ROCK CLIFF
- CRATER
- GRAVEL OR CINDER PIT
- SANDSPOT, SAND BLOWOUT
- F SMALL FROST POCKET
- SLUMP OR SLIDE ESCARPMENT, CIRQUE HEADWALL

DESCHUTES NATIONAL FOREST

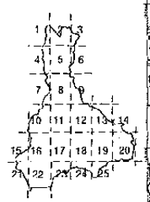
Soil Resource Inventory

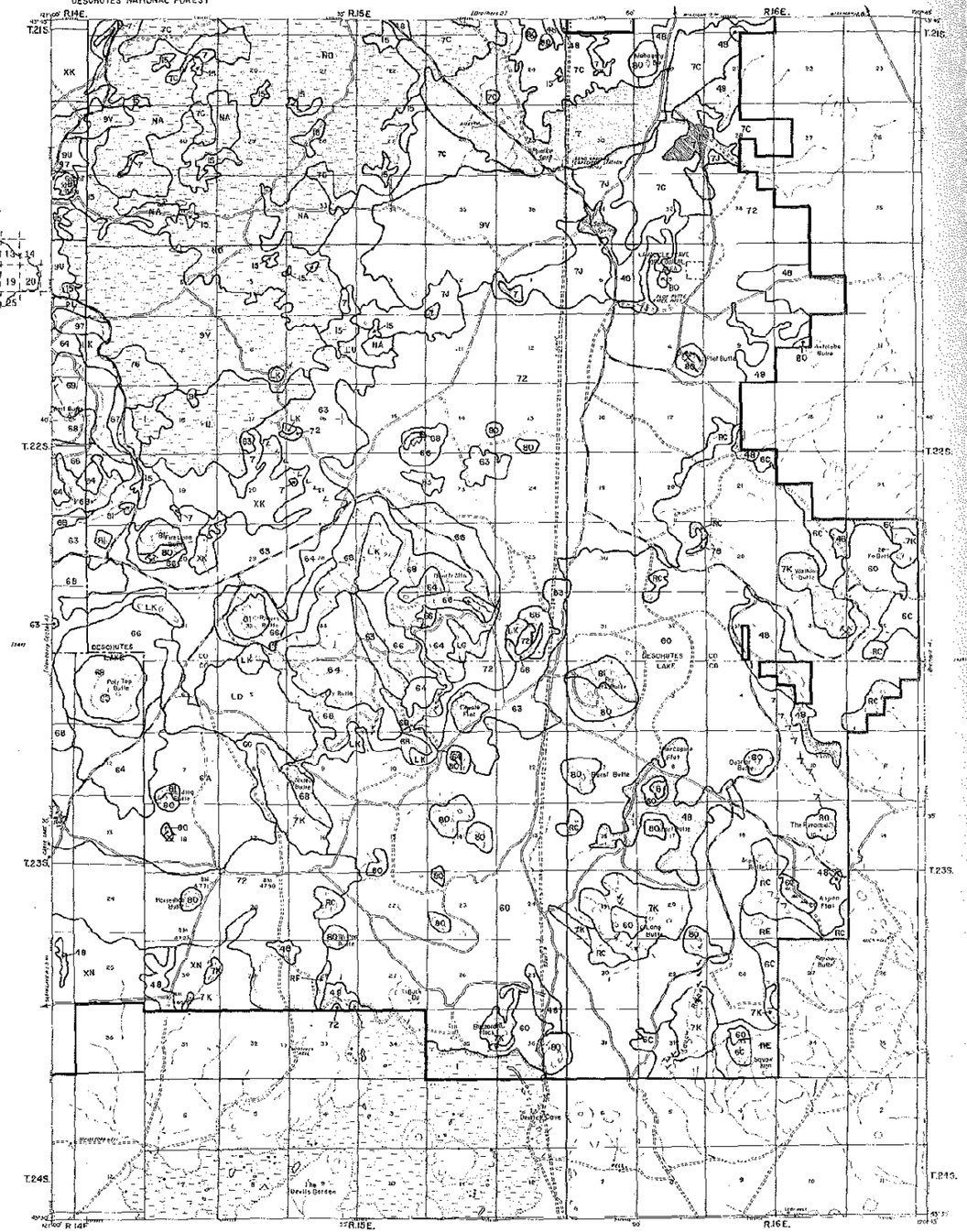
Soil Map — U.S.F.S. R-6, 1976

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
DESCHUTES NATIONAL FOREST

BROTHERS 3 QUADRANGLE
OREGON

20




R.14E.
R.15E.
R.16E.
T.21S.
T.22S.
T.23S.
T.24S.
T.21S.
T.22S.
T.23S.
T.24S.
DESCHUTES LAKE
Pole Top Butte
Horse Ridge Butte
Red Butte
Arrowhead Butte
Rimrock Butte
Devils Garden
Lava Flow
Lava Butte
Lava Cave
Lava River Cave
Lava River Trail
Dillon Falls
Deschutes River
Deschutes River Trail
Deschutes River Campground
Deschutes River Woods
Deschutes River Woods Campground
Benham Falls
Benham Falls Sno-Park
Benham Falls Campground
Benham Falls Trail
Benham Falls Loop Trail
Benham Falls Loop Trail Campground
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DESCHUTES NATIONAL FOREST

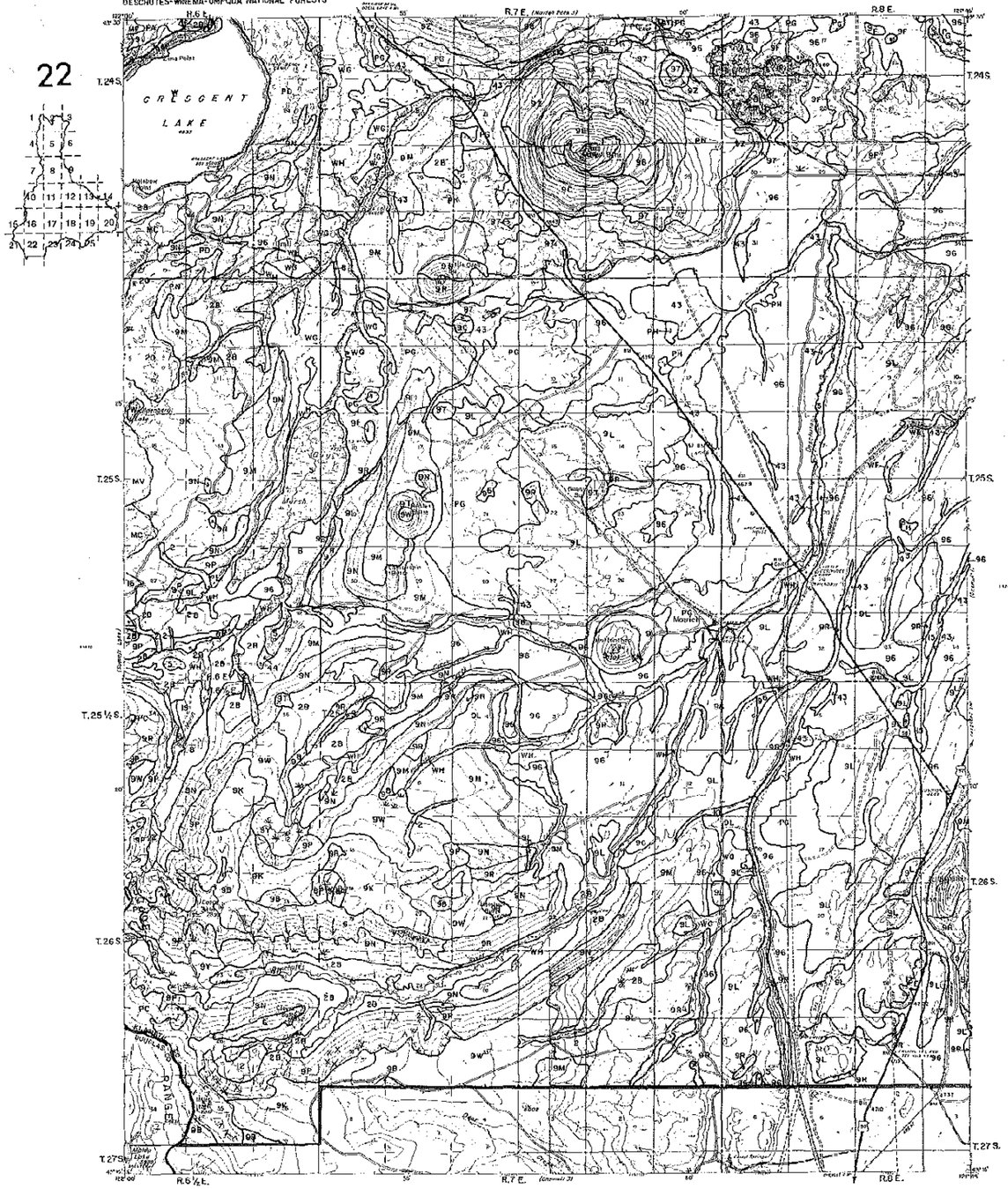
Soil Resource Inventory

Soil Map — U.S.F.S. R–6, 1976

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
DESCHUTES-WINEMA-UMPQUA NATIONAL FORESTS

CHEMULT 2 QUADRANGLE
OREGON

22



Soil mapping by U.S.F.S. Soil Scientists Daniel M. Larsen
and Robert A. Klink, Deschutes National Forest.
Mapping units are described in the Soil Resource Inventory Report.

- ROCK OUTCROP
- TALUS
- UNSTABLE AREA
- WET SPOT, SMALL MARSH OR POND
- AVALANCHE TRACK OR DEBRIS SLIDE
- FAULT ESCARPMENT, ROCK CLIFF
- GRAVEL OR CINDER PIT
- SANDSPOT, SAND BLOWOUT
- SMALL FROST POCKET
- SLUMP OR SLIDE ESCARPMENT, CIRQUE HEADWALL

DESCHUTES NATIONAL FOREST

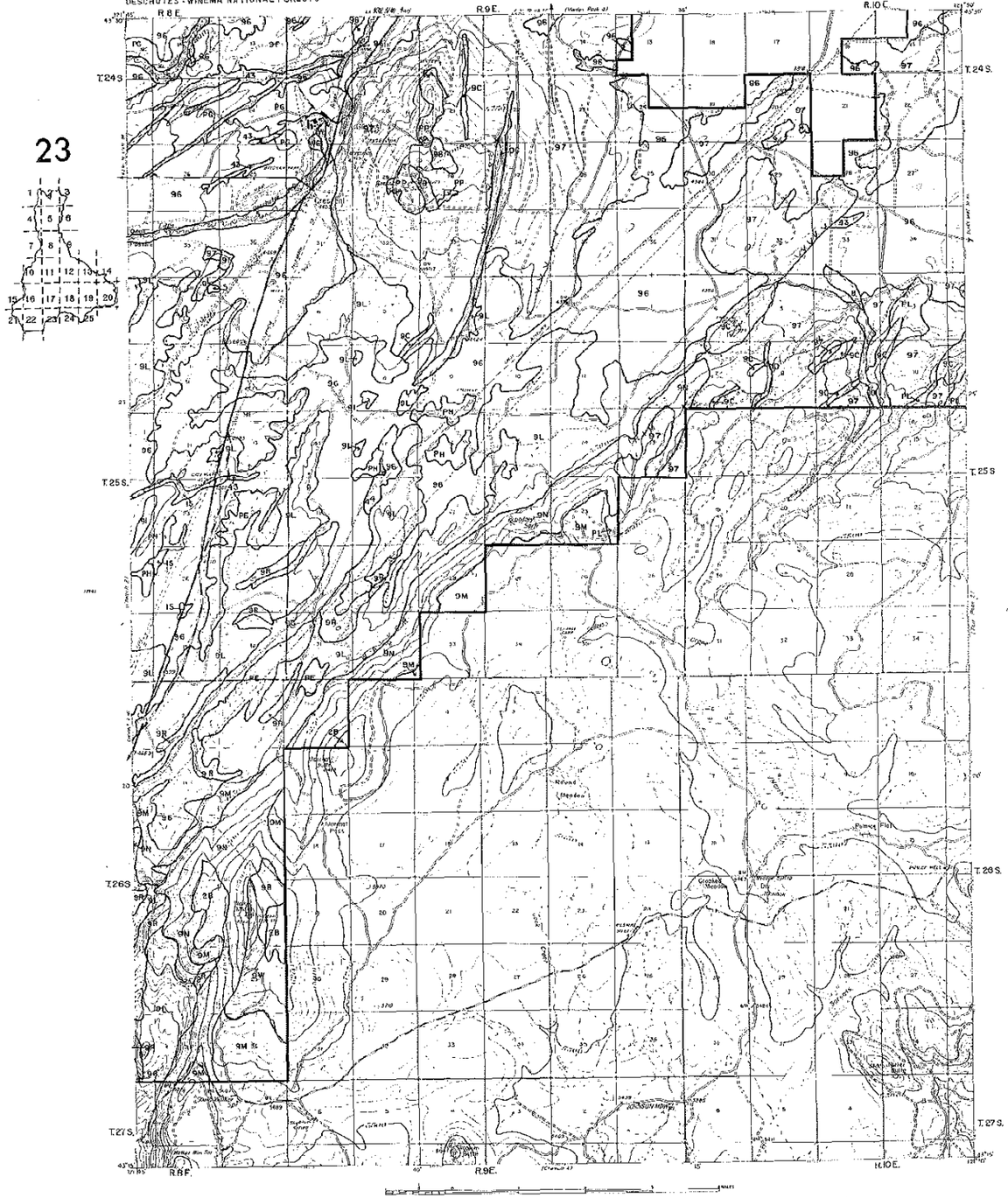
Soil Resource Inventory

Soil Map — U.S.F.S. R–6, 1976

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
DESCHUTES-WINEMA NATIONAL FORESTS

CHEMULT 1 QUADRANGLE
OREGON

23



Soil mapping by U.S.F.S. Soil Scientists Daniel M. Larsen
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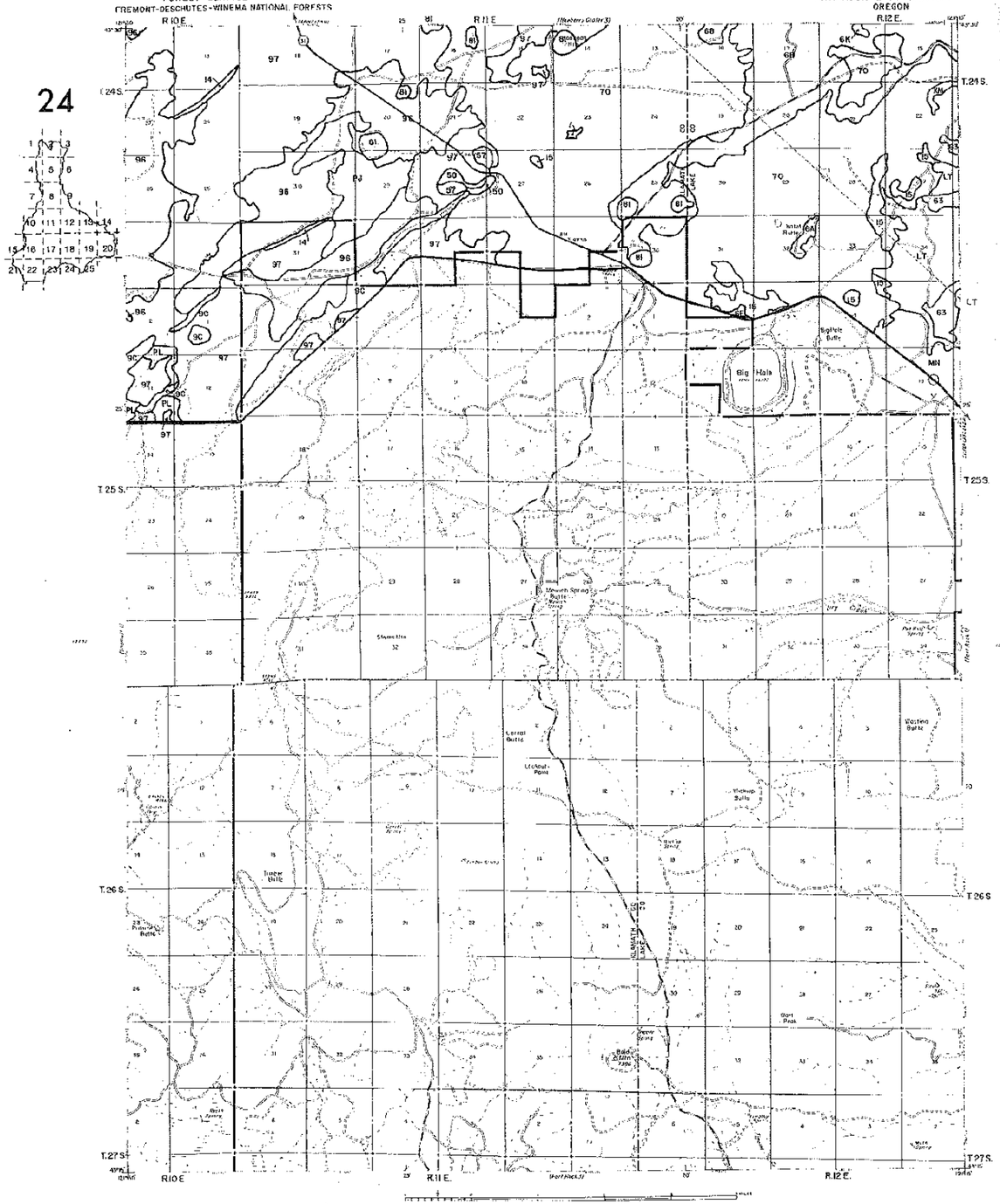
- ROCK OUTCROP
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DESCHUTES NATIONAL FOREST
Soil Resource Inventory
Soil Map — U.S.F.S. R–6, 1976

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
FREMONT-DESCHUTES-WINEMA NATIONAL FORESTS

FORT ROCK 2 QUADRANGLE
OREGON

24



Soil mapping by U.S.F.S. Soil Scientists Daniel M. Larsen
and Robert A. Klink, Deschutes National Forest.
Mapping units are described in the Soil Resource Inventory Report.

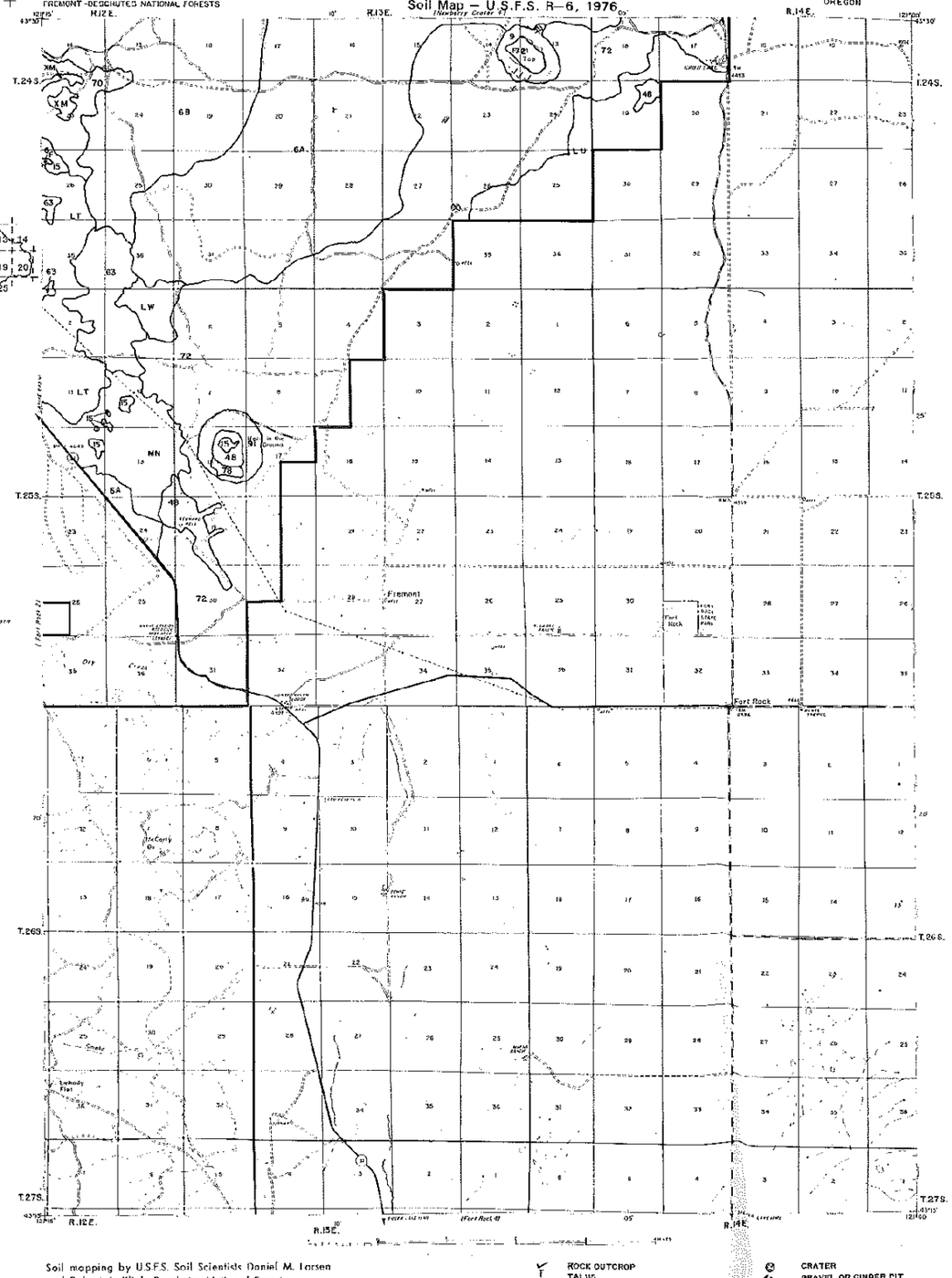
- ROCK OUTCROP
- TALUS
- X UNSTABLE AREA
- WET SPOT, SMALL MARSH OR POND
- AVALANCHE TRACK OR DEBRIS SLIDE
- FAULT ESCARPMENT, ROCK CLIFF
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DESCHUTES NATIONAL FOREST
Soil Resource Inventory
Soil Map — U.S.F.S. R–6, 1976

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
FREMONT-DESCHUTES NATIONAL FORESTS

FORT ROCK 1 QUADRANGLE
OREGON

25



Soil mapping by U.S.F.S. Soil Scientists Daniel M. Larsen
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