

SOIL SURVEY OF SHASTA-TRINITY FOREST AREA, CALIFORNIA



United States Department of Agriculture
Forest Service and Soil Conservation Service
in cooperation with
The Regents of the University of California
(Agricultural Experiment Station)



How To Use This Soil Survey

General Soil Map

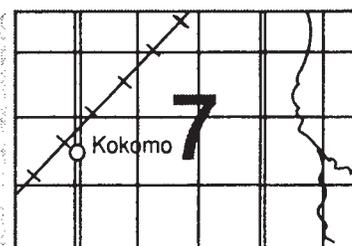
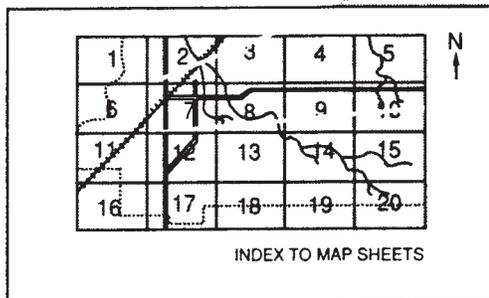
The general soil map, which is the small scale map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

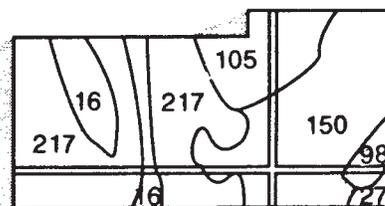
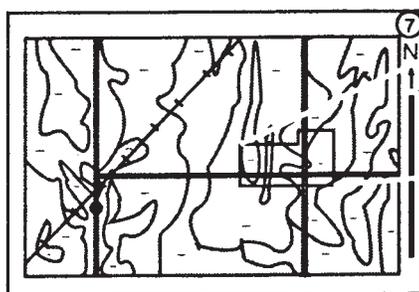
Detailed Soil Maps

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

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

Shasta-Trinity National Forests Area, California

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in 1980. Soil names and descriptions were approved in 1983. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1980. This survey was made cooperatively by the Soil Conservation Service, US Forest Service, and the University of California Department of Soils and Plant Nutrition. It is part of the technical assistance furnished to the land managers of the Forest Service and private land owners.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: View eastward toward Mt. Shasta from a mountain meadow.

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Atter Family	423	Grell Family	450
Avis Family	424	Henneke Family	451
Beaughton Family	425	Hohmann Family	452
Behanin Family	426	Holland Family	453
Brader Family	427	Hugo Family	455
Chaix Family	428	Huntmount Family	456
Chawanakee Family	429	Inville Family	457
Cheadle Family	430	Ishi Pishi Family	458
Copsey Family	431	Jayar Family	460
Coyata Family	432	Kang Family	461
Deadfall Family	433	Konocti Family	462
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Delaney Family	435	Lithic Cryochrepts	464
Dewmine Family	436	Lithic Cryumbrepts	465
Dubakella Family	437	Lithic Haploxeralfs	466
Dunsmuir Family	438	Lithic Xerumbrepts	467
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Dystric Xerothents	441	Marpa Family	469
Endlich Family	442	McCumber Family	470
Entic Cryumbrepts	443	Merkel Family	471
Etsel Family	444	Millsholm Family	472

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Nanny Family	474	Stecum Family	492
Neer Family	475	Stonewell Family	493
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Index to Map Units (Order 5)

Approximately 327,900 acres of the Shasta-Trinity National Forest, were mapped at the Fifth Order. The area is located in the Salmon-Trinity Alps Wilderness Area in the northern part of the Big Bar District. The soil polygon in an Order V survey are generally considerably larger than in an Order III survey. The boundary between the two levels of surveys is labeled on the soils maps.

Soil Symbols

The 5th Order soil symbols is comprised of three component parts. The letter F identifies the mapping unit as 5th Order. The second letter identifies the geology or rock type which this unit falls upon. The third component is an Arabic number which categorizes the soils.

Soils of the Wilderness Area Fifth Order Mapping Units

FV2	Dystric Cryochrepts, moderately steep to steep	380
FP2D	Dystric Xerochrepts-Dystric Cryochrepts association, gently sloping to moderately steep	381
FM3	Dystric Xerochrepts-Ultic Haploxeralfs association, moderately steep	382
FG2	Pachic Xerumbrepts-Lithic Cryorthents-Rock outcrop association, moderately steep	383
FV1	Rock outcrop-Lithic Cryochrepts association, moderately steep to steep	384
FU2	Rock outcrop-Lithic Xerochrepts-Typic Xerochrepts association, gently sloping to steep	385
FU1	Rock outcrop-Lithic Haploxerolls-Typic Xerochrepts association, moderately steep to steep	386
FP1	Rock outcrop-Lithic Cryumbrepts-Lithic Xerochrepts association, steep	387
FM1	Rock outcrop-Lithic Xerorthents-Lithic Xerochrepts association, moderately steep to steep	388
FG1	Rock outcrop-Lithic Xerumbrepts-Lithic Cryumbrepts association, steep	389
FM2	Rock outcrop-Pachic Xerumbrepts-Dystric Xerochrepts association, steep	390
FU3	Ultic Haploxeralfs-Typic Xerochrepts association, gently sloping to moderately steep	391

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Foreword

This soil survey contains information that can be used in land planning projects. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

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

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

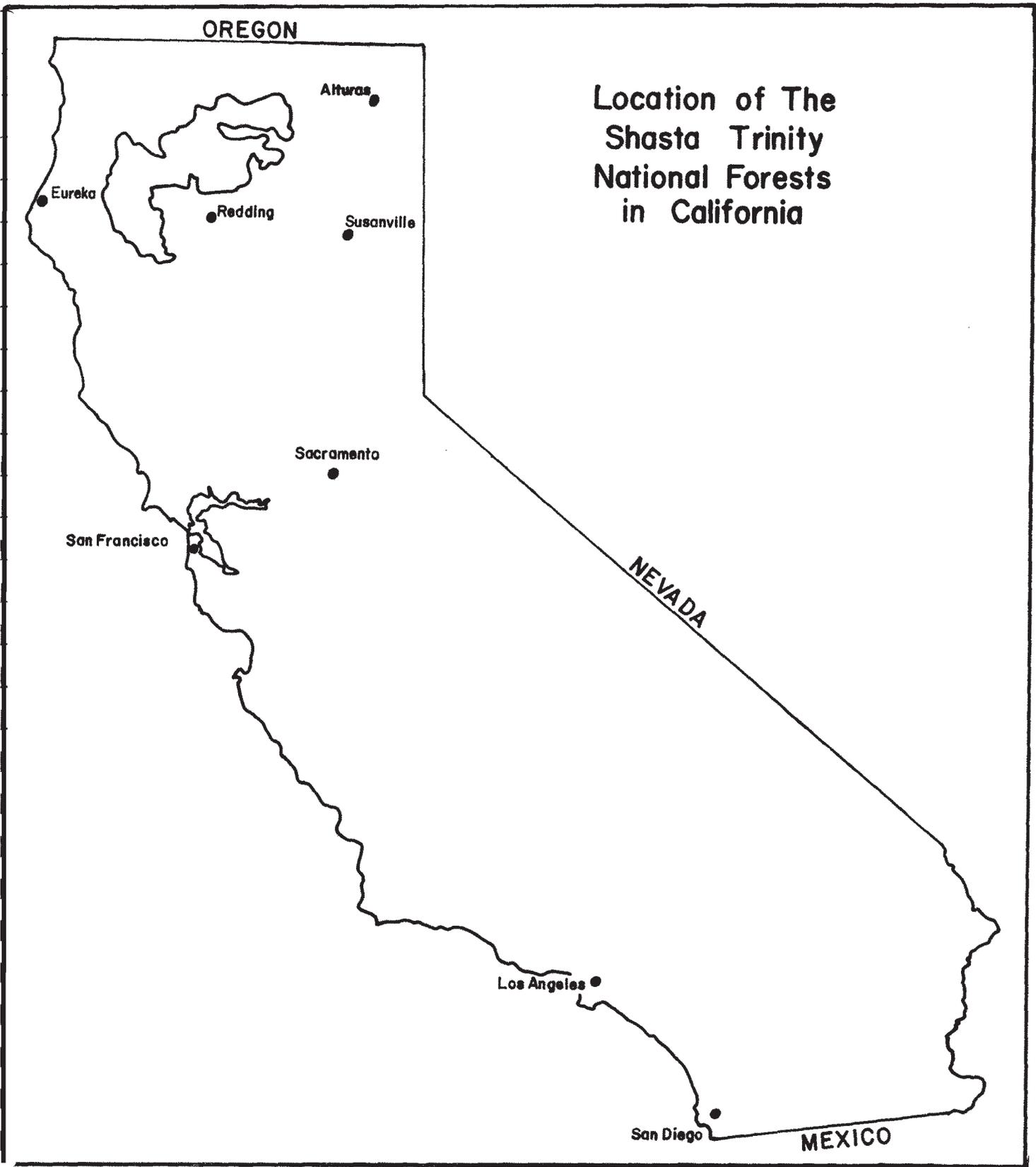
These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the Supervisor's Office of the Forest Service.

This survey was intended to provide soils information for broad land management planning and is not intended for use in project level work. The purpose of the soil survey is to provide soil resource information suitable for general planning stages for land management for allocation of resources based upon land capability for large tracts of land in a short period of time.



William V. Carpenter
Acting Forest Supervisor
Shasta-Trinity National Forests

Location of The Shasta Trinity National Forests in California



Soil Survey of Shasta-Trinity National Forest Area, California

By Kenneth E. Lanspa, Forest Service

Field work by Bud Adamson, Jack Fisher, Ken Johnson, Laura Kuh, Don Loader, Gary Nakamura, James Retelas, John Shumway and Peter Van Susteren

The SHASTA-TRINITY NATIONAL FORESTS is in northern California. It includes parts of Shasta, Tehama, Trinity, Siskiyou and Humboldt Counties. It covers parts of the California coast range, the Klamath Mountains, small parts of the Cascade Range and the Modoc Plateau.

It extends from about 42 degrees 30 minutes north latitude in the vicinity of Mt. Shasta and Medicine Lake south to about 42 degrees 05 minutes north latitude in the vicinity of the Yolla Bolly-Middle Eel Wilderness. Its most westerly boundary is on South Fork Mountain about 7 miles west of Hyampom about 123 degrees 35 minutes west longitude and its most easterly boundary is near the Burnt Lava Flow near Medicine Lake, about 121 degrees 27 minutes west longitude. It is bounded by the Mendocino National Forest on the south, the Six Rivers National Forest on the west, the Klamath on the northwest and the Modoc on the northeast. The Forest is crossed by U.S. Highway 299 and I-5.

The area of the Forests is 2,814,257 acres; 2,146,269 acres are Forest Service and the rest is privately owned. The Forests consists of seven Ranger Districts, Big Bar, Hayfork, McCloud, Mt. Shasta, Shasta Lake, Weaverville, and Yolla Bolla. Forests Headquarters are in Redding, California.

General Nature of the Survey Area

This section provides general information about the survey area. It discusses history and development, natural vegetation, geomorphology, geology, relief, drainage, water supply and climate.

History and Development

The Trinity Forest Reserve was created by proclamation of President Theodore Roosevelt on April 26, 1905. The Shasta Forest Reserve was created half a year later on October 3, 1905. In 1907, the term "forest reserves" was changed to "national forests". The objective of the name change was to emphasize that the resources of the reserves were open for use as long as it was compatible with the preservation and perpetuation of resources such as wood, water, forage and recreation.

The headquarters for the Shasta National Forest was established at Sisson in Siskiyou County. In the early 1920's, the name Sisson was changed to Mt. Shasta. The headquarters for the Trinity National Forest was established at Weaverville. In 1954, the two Forests were consolidated as an economy move for purposes of management; however, they still have a separate identity.

Prior to consolidation, the Shasta N.F. had seven ranger districts: Trinity, Sacramento, Redding, Goosenest, Pit, McCloud and Scott. At the time of the consolidation move, the Goosenest district was transferred to Klamath National Forest and the Pit district was annexed to Lassen National Forest for administrative purposes. The Big Bend area of the Pit district was attached to the Shasta Lake district. The new administrative headquarters for the Forests were established at Redding.

Early rangers spent much of their time administering grazing allotments, examining homestead claims, building trails and lookouts and fighting fires. The diary of the first ranger on the Hayfork District, James William Patton, give a glimpse of the year-round activities of an early ranger. He made many trips to the top of Dubakella Mountain to look for fires (there were no lookouts then), he "shod horses" and "worked on (a) foot-bridge across Dobbins Gulch near (the) post office". He

also attended rangers meetings in Weaverville, and in the spring and summer, he made out grazing applications. "His salary was \$60 a month and he had to furnish his own saddle horse and pack animals".

Early lookouts are a reminder of early Forest Service activity. At first, tall trees were frequently used as lookouts. They had a ladder affixed or were equipped with iron spikes for climbing. Pettijohn Mountain has a lookout tree on which the iron spikes are still in evidence.

The earliest lookouts were built on the highest peaks so that a large area could be watched for fires. With the coming of industrial smoke, it became difficult to distinguish between haze created by the mills and smoke from forest fires. The lookouts were then placed at lower altitudes. Among the earliest lookouts were the ones on Mt. Eddy in Siskiyou County and Dubakella Mountain in Trinity County.

When the first pioneers came to the area, much of Shasta County was covered with a dense forest. However, as early as the 1880's, the slopes on Mt. Shasta had been stripped of their timber stand. When the Central Pacific Railroad completed its line to Portland in 1887, lumbering began on a large scale. Much of the land cut over by the early mills is now National Forest land. Frequent fires, which followed upon logging, destroyed the young growth, and chaparral invaded large areas of land. In Trinity N.F., the inaccessibility and lack of railroad transportation have probably been the reasons for its preservation as one of the few remaining virgin forests in California.

Cattle raising was important in parts of the Shasta N.F. and nearby valleys, especially in the settlement of Shasta Valley, Fall River Valley and McCloud Valley and the upper end of the Sacramento Valley. Around 1915, approximately 10,000 head of cattle and horses and 19,000 sheep and goats grazed on the Trinity Forest. By 1931, the number of livestock had decreased to approximately 7,800 and 10,000 head respectively.

At present, the Shasta-Trinity National Forests provide lumber, grazing and a variety of recreational opportunities: skiing, boating, camping, fishing and hunting.

Climate

The area of the Shasta-Trinity National Forests has a Mediterranean climate with cool moist winters and warm dry summers. The average January temperature ranges from 20°F on Mt. Shasta and 33°F at the town of Mt. Shasta to 44°F at Shasta Lake. The average July temperature ranges from 66°F at the town of Mt. Shasta to 81°F at Shasta Lake and along the eastern border.

Precipitation ranges from less than 20 inches on the northwest side of Mt. Shasta near Lake Dwinnell to over 70 inches west of Volmers, in the Trinity Mountains and on South Fork Mountain. Roughly 80 percent of the total precipitation falls in the six month period between November and April. Most of the precipitation is from Pacific storms of several days duration and moderate intensity. Snow can occur at all elevation but in moderate amounts above 2,000 feet and only above 4,000 feet does snow remain on the ground for very long period. Significant fog persists at times in Hayfork Valley and in the valleys of the Trinity River.

Geomorphology and Geology

The Shasta-Trinity National Forests are geologically quite diverse and complex. Portions of five geomorphic provinces are contained within the forests, each having its own distinct character and development. Geomorphic provinces include the Coast Range, Klamath Mountains, Great Valley, Cascades and Modoc Plateau.

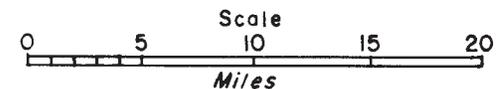
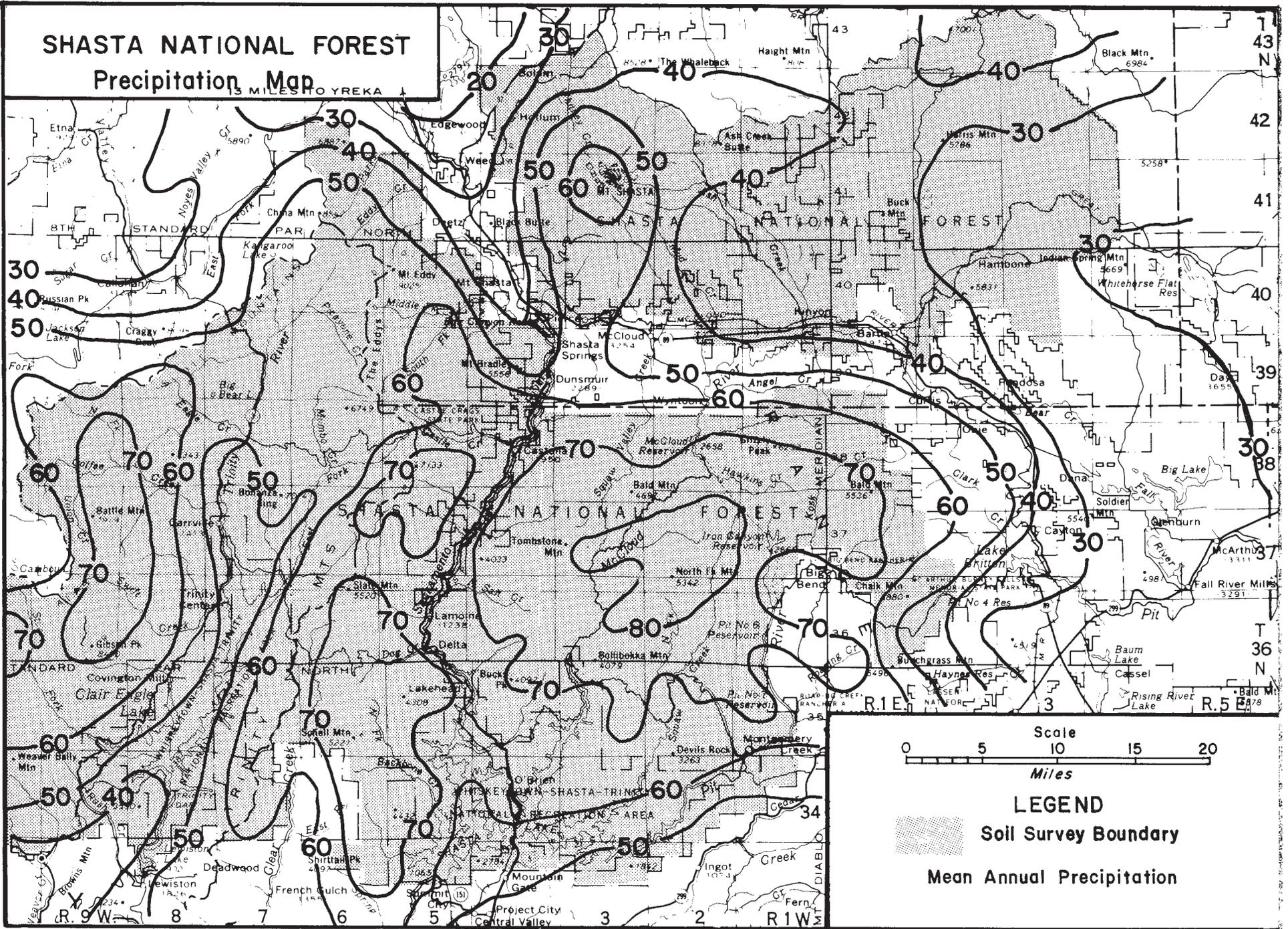
There are two major drainages within the Forests; the Trinity and the Upper Sacramento Rivers. Subdrainages within the Trinity include the North Fork, East Fork and South Fork. Major tributaries to the upper Sacramento River include the Pit River, and McCloud River which both flow into Shasta Lake.

Prominent mountain ranges within the Forests include the Trinity Alps, Eddies, Yolla Bollys, South Fork Mountain and the Scott Mountains. Mount Shasta is the highest point on the Forest, having an elevation of 14,161 feet. The lowest point is along the Trinity River near Burnt Ranch at 670 feet.

The Coast Range province is located along the western edge of the Trinity Forest. It is composed of faulted blocks of Cretaceous (63 to 135 m.y.) sediments and is bounded by the South Fork Mountain Schist along its eastern limit. Slopes are generally steeply dissected and mass wasting has dominated the geomorphic development of these landscapes.

The Klamath Mountains lie east of the Coast Ranges and are the largest of the provinces within the Forests. The Klamaths are the most diverse province, being composed of 6 major belts of rock which range in age from Ordovician (500 m.y.) to Jurassic (135 m.y.). Major lithologies include shales, chert, limestone, metasedimentary phylites, metavolcanic greenstone, peridotite, serpentine, diorite, gabbro, and granodiorite. Major intrusions within the Klamaths include the Ironside Mountain and the Hayfork - Bally Batholiths. Geomorphic development of this province is as complex as the geology. Slopes are generally steep and dissected with some

SHASTA NATIONAL FOREST Precipitation Map

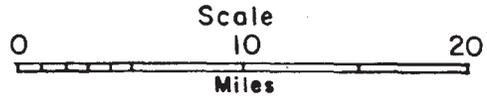


LEGEND
 Soil Survey Boundary
 Mean Annual Precipitation

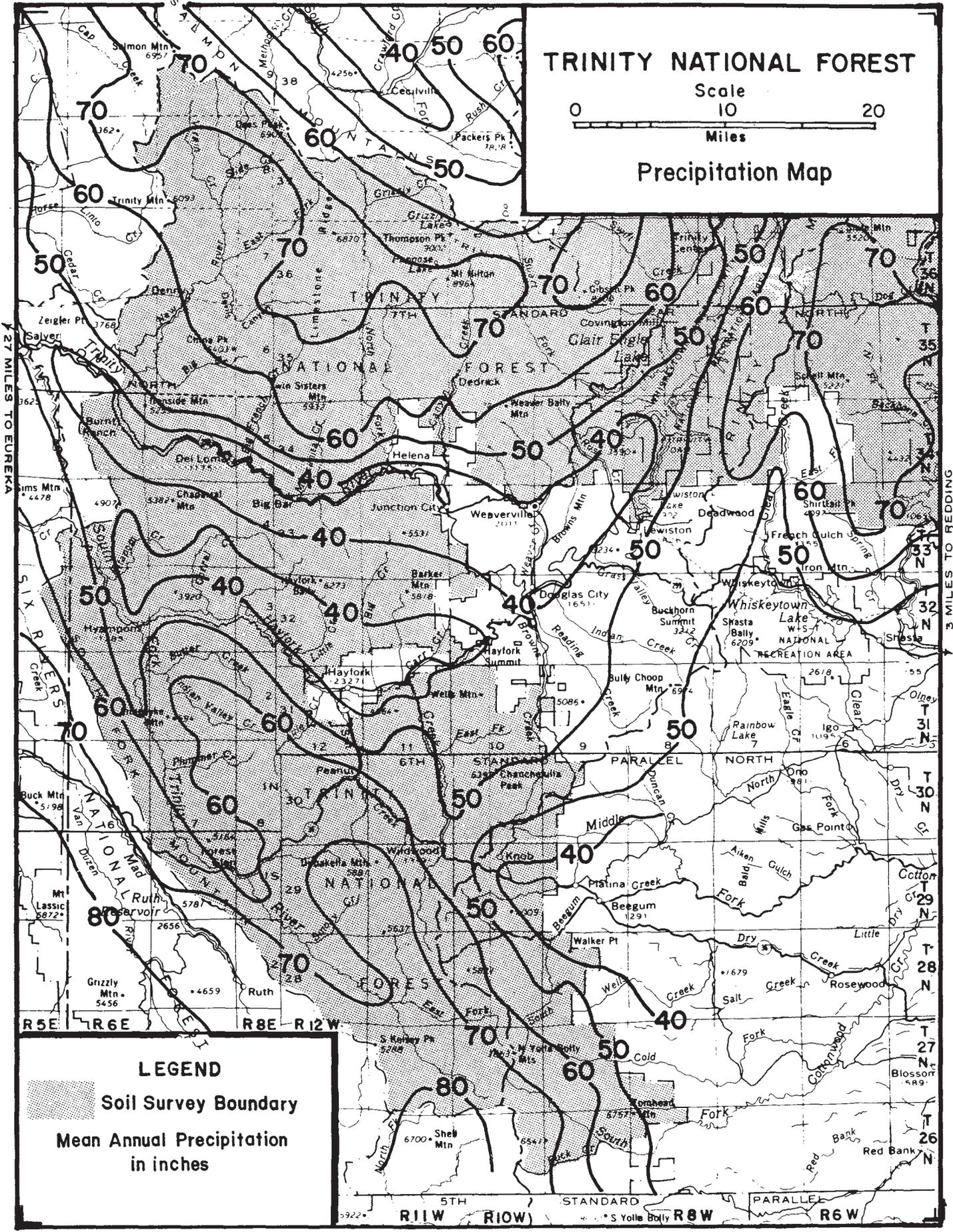
3A

6 MILES TO REDDING

TRINITY NATIONAL FOREST



Precipitation Map

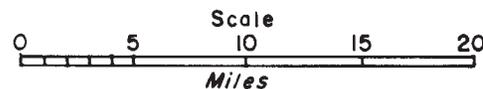
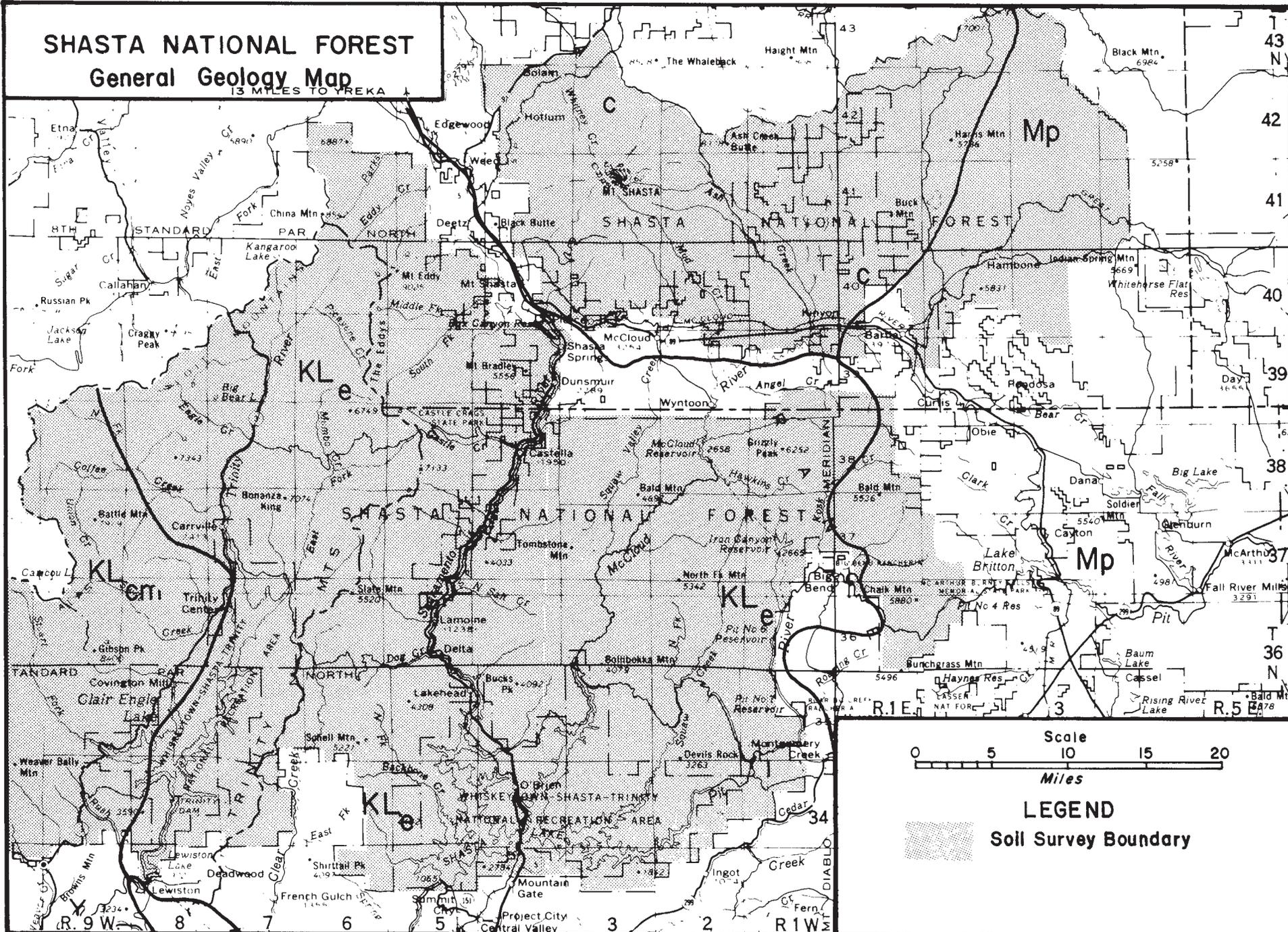


LEGEND

- Soil Survey Boundary
- Mean Annual Precipitation in inches

SHASTA NATIONAL FOREST General Geology Map

13 MILES TO YREKA

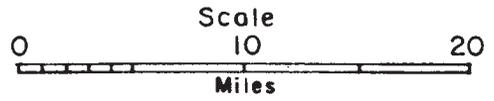


LEGEND
Soil Survey Boundary

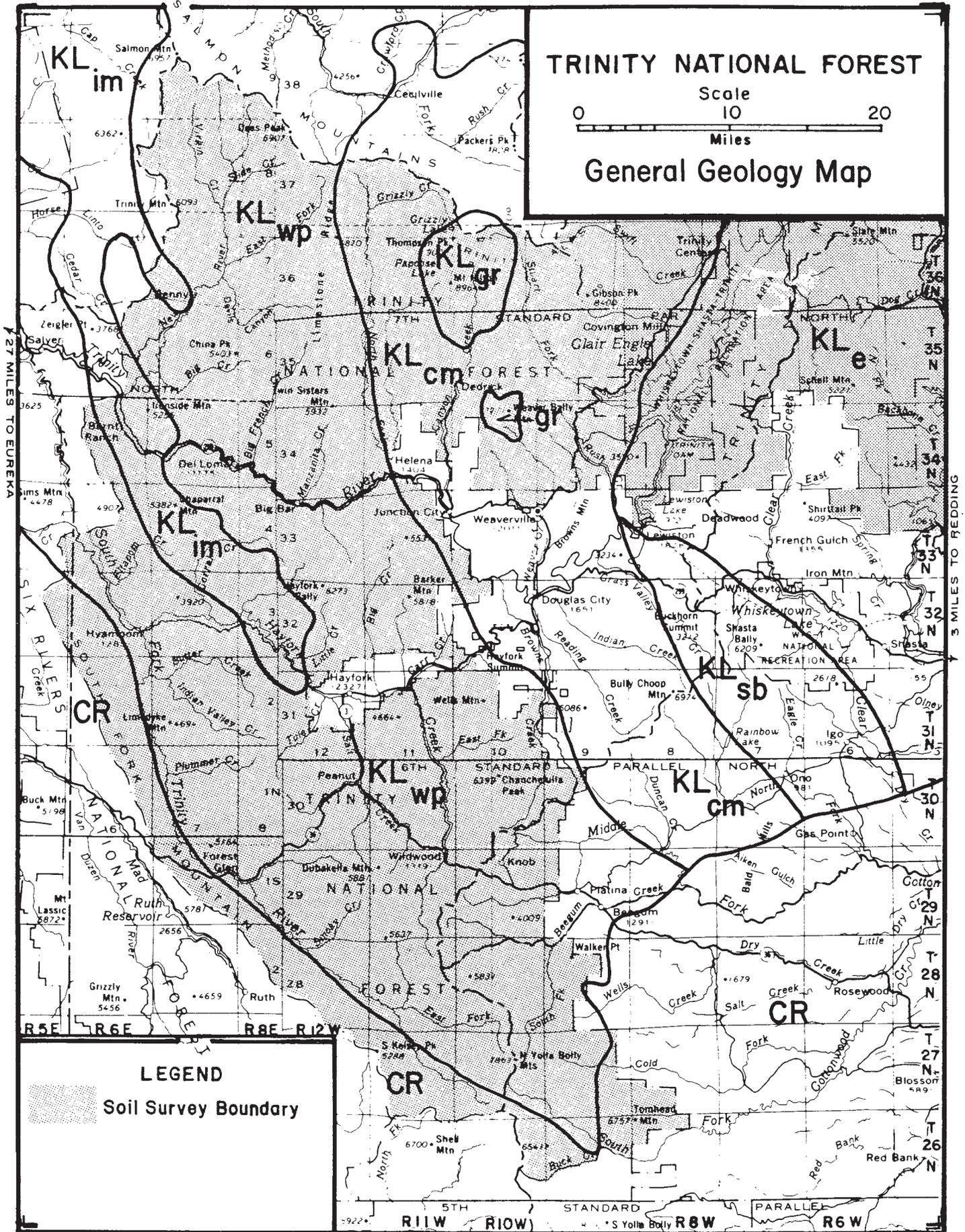
4A

6 MILES TO REDDING

TRINITY NATIONAL FOREST



General Geology Map



LEGEND

Soil Survey Boundary

flat upland areas. Mass wasting has again played a dominant role in the development of the landscape. Glacial features are evident in the Trinity Alps along the Trinity - Sacramento divide, and in the Yolla Bollys, Eddies and Scott Mountains.

A minor portion of the Great Valley province is located in the southeast corner of the Trinity Forest. It is composed of a homoclinal sequence of interbedded sediments, striking northwest and dipping eastward.

The Cascade Province is located within the Shasta Forest and prominently includes the active Mt. Shasta stratovolcano and the medicine shield volcano, with Medicine Lake occupying its collapsed caldera. The province is characterized by a broad undulating volcanic

plateau broken by cinder cones, and small stratovolcanoes. Andesite lava flows are the dominant rock type in the province. Other major lithologies include basalt, volcanic mudflows, tuffaceous sediments, pyroclastics, ash and pumice deposits. These rocks vary in age from (13 m.y.) Pliocene to Recent (500 y).

The Modoc Plateau Province is located within the Shasta Forest. It too is characterized as an undulating volcanic plateau broken by scattered volcanic cones. Extensional block faulting has resulted in local basins which in the Pleistocene (2.5 m.y.) were occupied by large freshwater lakes. Fissure type basaltic lava flows are the dominant lithology. Pumice, ash and mudflow deposits also occur. These rocks vary in age from Miocene (25 m.y.) to Recent.

TABLE 1. - Geology Legend

CR	Coast Range	Lower		Metasediments, schist meta-volcanics
KL	Klamath	WP	Western	Metasediments, limestone, ultramafic, meta-volcanics, basic intrusives, granitic intrusives
KL	CM	Central Metamorphic		Hornblende and Mica Schist
KL		E	Eastern Belt	Metavolcanics, metasediments, limestone, ultramafic intrusives, basic intrusives granitic intrusives
		SB	Shasta Bally	
		IM	Ironside Mt.	gr - Granitic intrusion
GV	Great Valley			Sediments
C	Cascade			Lava Flows, pyroclastics, mudflows, ash, pumice
MP	Modoc Plateau			Lava flows, pyroclastics mudflows, ash, pumice

Vegetation

The major plant community on the survey area, and the primary timber producing community, is mixed conifer - hardwoods consisting of Douglas-fir, ponderosa pine, sugar pine, canyon live oak and California black oak with associated species of brush such as green leaf manzanita and various species of Ceanothus. These areas are generally less than 4,000 feet in elevation. At higher elevations, white fir are the dominant conifers grading into and red fir above 5,500 feet with green leaf manzanita, pinemat manzanita and shrub tanoak dominating the understory.

In the northeastern part of the survey area, from Mt. Shasta to the eastern boundary, the area is underlain by volcanic rocks. The dominant conifers are ponderosa pine and white fir with an understory of green leaf manzanita and snowbrush. At high elevations, red fir and white fir become dominant. Lodgepole pine also dominates some flat, poorly drained or frost pocket areas.

A large body of ultramafic rock, the Trinity Ultramafic Sheet, lies west of Interstate 5 and east of Trinity Lake and extend north to Weed. The dominant conifers in this area is Jeffrey pine. Douglas-fir is the dominant species grading into an enriched mixed conifer forest type consisting of western white pine, incense cedar, Jeffrey pine, ponderosa pine, Douglas-fir, and white fir at higher elevations. Huckleberry oak and California coffeeberry is the dominant brush species along with greenleaf manzanita, squaw carpet and pinemat manzanita.

Along the far east side of the Trinity Forest and on south and west aspects, at lower elevations, the soils are generally too shallow and the site too hot to support commercial conifers. Canyon live oak, whiteleaf manzanita, western red bud, chamise, digger pine, poison oak, knobcone pine, brewer oak, shrub California black oak, and mountain whitethorn are common. With increase elevations or with easterly or northerly exposures, ponderosa pine first then Douglas-fir appear. The underlying rocks here are mostly metasedimentary and metamorphic rocks. When these hotter sites have developed from ultramafic rocks, Jeffrey pine and incense cedar will be the dominant any commercial species. Digger pine, buckbrush (*Ceanothus cuneatus*), thicketleaf and sierra coffeeberry are associated species.

Forest Uses

Timber production is the dominant land use on the Forests. Second in importance is recreation, which includes boating, water skiing, hunting, fishing, hiking, and offroad vehicle use. Shasta Lake and Trinity Lake are the two largest lakes, within the Forest boundary, that provide most of the water use recreation. There are, however, many smaller lakes, particularly in the Salmon-Trinity Alps Primitive Area. Watershed, fisheries, and wild values are important resources for land use. Range use is of limited extent. The mineral resources are concentrated in the Denny area of the Big Bar District and around Shasta Lake.

How The Survey Was Made

Soil Scientists mapped these lands to learn what kinds of soils are in the Shasta-Trinity National Forests, where they are located and how they can best be used.

Observations were made as to the steepness and shape of slopes; the kinds of native plants and plant communities; the kinds of rock; and many facts about the soils. Holes were dug or bored to expose soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down to rock material that has not undergone much change by leaching, weathering, or the action of plant roots. The maximum soil depth observed, in most cases, was 60 inches (150 cm). Some soils are known to be deeper.

The soil scientists made comparisons among the profiles they studied. They classified the soils according to nationwide, uniform procedures. The soils were classified to the family, subgroup, or suborder depending on the frequency of occurrence.

Soils that have similar profiles make up a family. Except for relatively minor variations, all of the soils of one family have major horizons that are similar in such important characteristics as texture, thickness, and arrangement. Each family is given the name of the soil series that has been designated as representative for that family. Olete and Wintoner families are the names of two soil families mapped in the survey area.

This does not mean that these soil series were mapped here, but rather the taxonomic families of which those series are members. The Olete soil, for example, is a member of the loamy-skeletal, mixed, mesic family of Typic Xerochrepts. All the soils in the United States that have the same family names may differ in slope, stoniness, depth, or some other characteristic affecting land use. On the basis of such differences, a soil family is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Ovall family, ponded, is a management phase within the Ovall family, that indicates higher water table at some time during the year.

After a system for identifying, classifying, naming and mapping the soils had been worked out, the soil scientists drew boundaries around individual mapping units on aerial photographs. These photographs (in stereoscopic pairs) show roads, streams, vegetation and topography which help in drawing boundaries accurately.

The areas shown on the soil maps are called mapping units. Most of the mapping units in this survey are complexes or associations of soil phases that are too intermingled to be shown separately at this scale of mapping. The name of a complex or association consists of the names of the dominant soils, joined by a hyphen. Neuns-Goulding families association, 40 to 60 percent slopes, is an example.

Special spot symbols are used where the areas are too small to delineate on the photograph.

Also mapped in the survey area are areas that are so rocky, or so shallow, that they cannot be called soils. These areas are miscellaneous land types and are identified on the maps. Rock outcrop and Rubble land are miscellaneous land types that have been mapped on the Shasta-Trinity National Forests.

While a soil survey is in progress, samples of soil are collected, as needed, for laboratory analysis. Data on growth and yields of coniferous trees are also collected during the survey. From these observations, yields and behavior under defined systems of management are estimated for all soils mapped.

Information on soils and their characteristics is essential to sound land use planning on forested areas. To provide such information, the U.S. Forest Service has made a soil resource inventory of the Shasta-Trinity National Forests. The soils resource inventory is primarily an Order 3 soil survey at a map scale of approximately 1:63,360. The mapping units are associations, complexes, and consociations of soils classified to phases of families, family, subgroup or suborder. The Alps Wilderness area was mapped at the Order 5 level and was broadly mapped at the Subgroup level.

The Order 3 soil survey provides information about the soils, their capabilities and their limitations. It is intended for broad scale land use planning. It is not intended for project-level planning without further field investigation, although it does provide a sound background for project level studies. Delineation are as small as 10 acres for highly contrasting soils. On non-contrasting soils, delineations are as small as 40 acres.

The Order 5 provides soil data suited for very general planning applicable to predicting major land uses. It was mapped by photo interpretation based on widely spaced observations. The boundary between the two Orders of surveys is labeled on the soil maps.

This survey was intended to provide soils information for broad land management planning and is *not* intended for use in project level work. The purpose of the Soils Resource Inventory (SRI) is to provide soil resource information suitable for general planning stages for land management for allocation of resources based upon land

capability for large tracts of land in a short period of time.

Mapping was carried out in 1:63,360 (1 inch/mile) scale, black and white aerial photos. The delineations (polygons) were transferred to 1:24,000 (2.64 inch/mile) base maps.

General Soil Map Units

The general soil map shows map units which consist of many individual soils. Each map unit consists of soils that have similar parent rock material and similar soil temperature regimes. A map unit typically is made up of one or more soils of major extent and several soils of minor extent. Map units are named for the major soils in the unit. The soils in one unit can occur in other units. The soils are classified at the family level or a higher taxonomic level.

The general soil map furnishes a broad perspective of the soils in the survey area. It provides a basis for comparing the potential of large areas for general kinds of land use. General areas which are capable of timber production or spring-summer range can be identified on the map. Likewise, general areas of soils having properties that are distinctly unfavorable for certain land uses can be identified.

Because of the generalization of map units and the small scale of the map, the location of specific soils is not shown. The map and map unit information are not suitable for land management planning at the forestwide or project level. They give a very general overview of soil conditions and are suitable for state or regional planning. Groups of soils and the map units making up each group are described on the pages that follow.

General Soil Map Legend

1. **Typic Xerorthents - Neuns family - Yolla Bolla family** soils on South Fork Mountain schist and associated metasediments-frigid temperature regime.

Plant communities and use consist of chaparral/pussy paws/white fir/upper montane mixed conifer; moderate timber production.

Topography is moderate to steep high elevation side slopes.

2. **Holland, deep - Neuns - Hugo families** soils on South Fork Mountain schist and associated metasediments mesic temperature regime.

Plant communities and use consist of Douglas-fir - pine mixed conifer forest; high timber production.

Topography is gentle to steep unstable side slopes.

3. **Rock outcrops - Entic Cryumbrepts - Merkel family** soils on metasediments - frigid temperature regime.

Plant communities and use consist of upper montane and subalpine- moist meadows/Sierran-Cascade mixed conifer forest; wildlife and watershed.

Topography is moderate to very steep mountain side slopes.

4. **Neuns - Deadwood - Marpa families** soils on metasediment - mesic temperature regime.

Plant communities and use consist of Douglas-fir - pine mixed conifer; moderate timber production.

Topography is gentle to steep side slopes.

5. **Rock outcrops - Henneke - Stonyford families** soils on metasediments - thermic temperature regime.

Plant communities and use consist of low montane and foothill mixed chaparral/low montane hardwood conifers; wildlife and watershed.

Topography is moderate to steep mountain side slopes.

6. **Rock outcrop - Lithic Xerumbrepts - Stecum family** soils on granitics and diorites - frigid temperature regime.

Plant communities and use consist of upper montane mixed chaparral/red fir - white fir forest; moderate timber production and wildlife.

Topography is moderate to very steep mountain side slopes.

Chawanakee - Chaix - Holland, granitic families soils on granitics and diorites - mesic temperature regime.

Plant communities and use consist of mixed conifer - black oak forest; high timber production.

Topography is gentle to steep mountain side slopes.

7. **Marpa - Hugo - Jayar families** soils on mafic igneous - mesic to frigid temperature regime.

Plant communities and use consist of Sierran - Cascade mixed conifers/red fir - white fir forest; moderate timber production.

Topography is moderate to very steep side slopes.

8. **Rock outcrops - Toadlake - Olete families** soils on ultramafics and serpentine - frigid temperature regime.

Plant communities and use consist of upper montane serpentine semi barrens/Jeffrey pine mixed conifer forest/western white pine subalpine woodland; wildlife and watershed.

Topography is moderately steep to very steep mountain side slope.

9. **Dubakella - Weitchpec - Ishi-Pishi families** soils on ultramafics and serpentine - mesic temperature regime.

Plant communities and use consist of Jeffrey pine mixed conifer forest/Sierran-Cascade mixed conifer forest/Jeffrey pine - incense cedar woodland; moderate timber production.

Topography is gentle to steep mountain side slopes.

10. **Sheld - Yallani families - Rock outcrops** soils on volcanic uplands.

Plant communities and use consist of Ponderosa pine - white fir forest/upper Montane mixed conifer; low to moderate timber production.

Topography is gently sloping to steep side slope and lava flows.

11. **Shasta - Germany - Ovall families** soils on volcanic rubble lands - lava ridges.

Plant communities and use consist of lodgepole pine forest/lodgepole pine - Ponderosa pine - white fir forest; moderate timber production.

Topography is outwash terraces, dry lake beds and lava ridges.

12. **Ledmount - Germany - Sheld families** soils on recent volcanics - lava flows - cinder cones.

Plant communities and use consist of bitterbrush - goldenbrush scrub/Ponderosa pine - white fir mixed conifer; low timber production and wildlife.

Topography is gently sloping to level lava flows with cinder cones and lava rockland.

13. **Yallani family, pumice overburden - Stonewell families** soils on pumice deposits.

Plant communities and use consist of lodgepole pine forest/lodgepole pine - white fir - red fir mixed conifer/snowbrush chaparral; low timber production and wildlife.

Topography is level outwash terraces and steep side slopes under pumice overburden.

14. **Sheld - Revit families - Typic Cryandepts** soils on volcanic peaks and glacial side slope.

Plant communities and use consist of upper Montane mixed chaparral/bare ground/red fir - white fir forest/red fir forest; low timber production and wildlife.

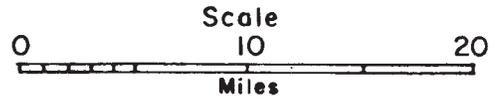
Topography is talus slopes; rockland; glacial deposits, outwash terraces and moraines; steep side-slopes.

15. **Shasta - Delaney families** soils on mudflows deposits and outwash terraces.

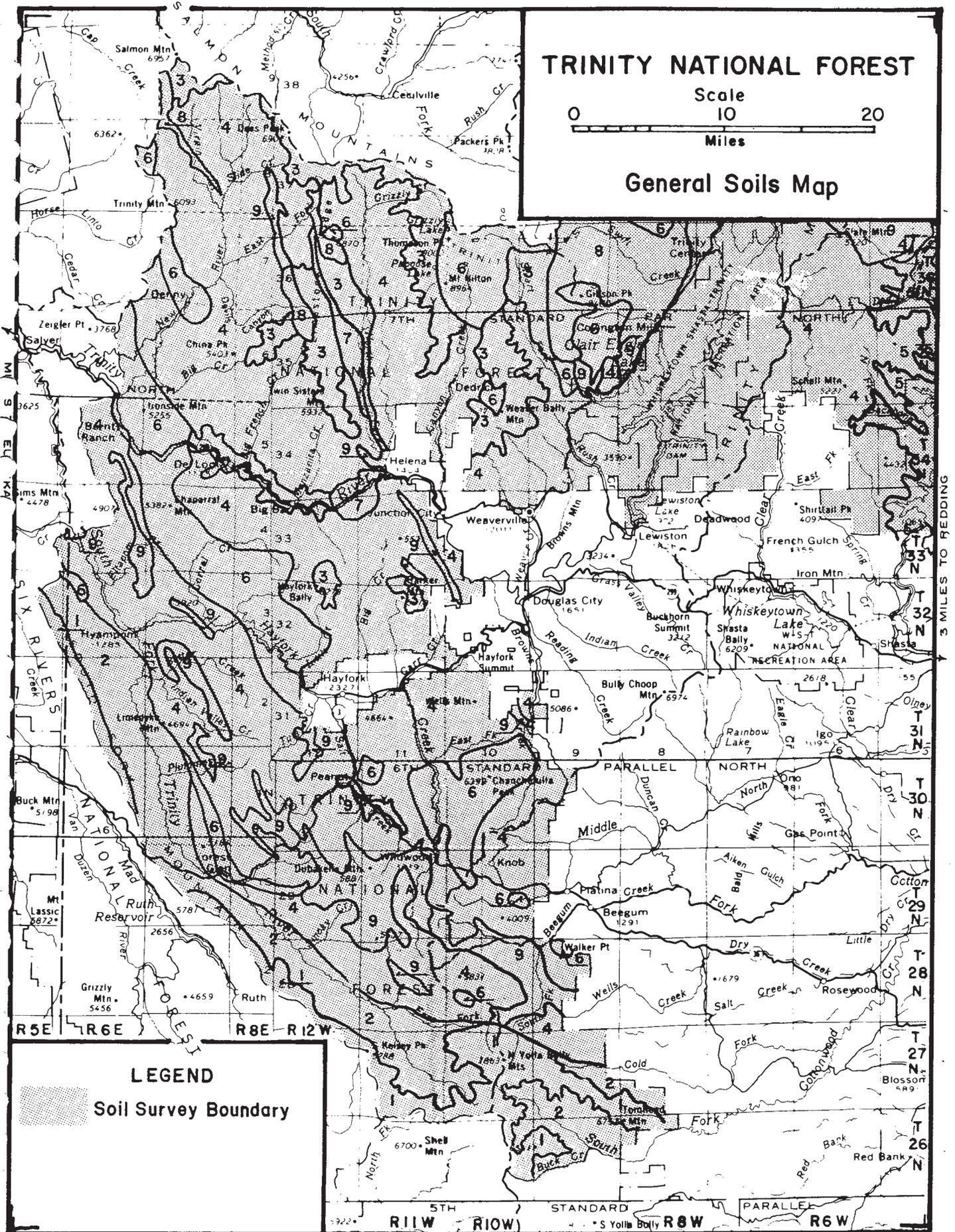
Plant communities and use consist of white fir - red fir forest/Ponderosa pine forest/grassland; wildlife and moderate timber production.

Topography is level to gently sloping mudflows and outwash flats.

TRINITY NATIONAL FOREST



General Soils Map

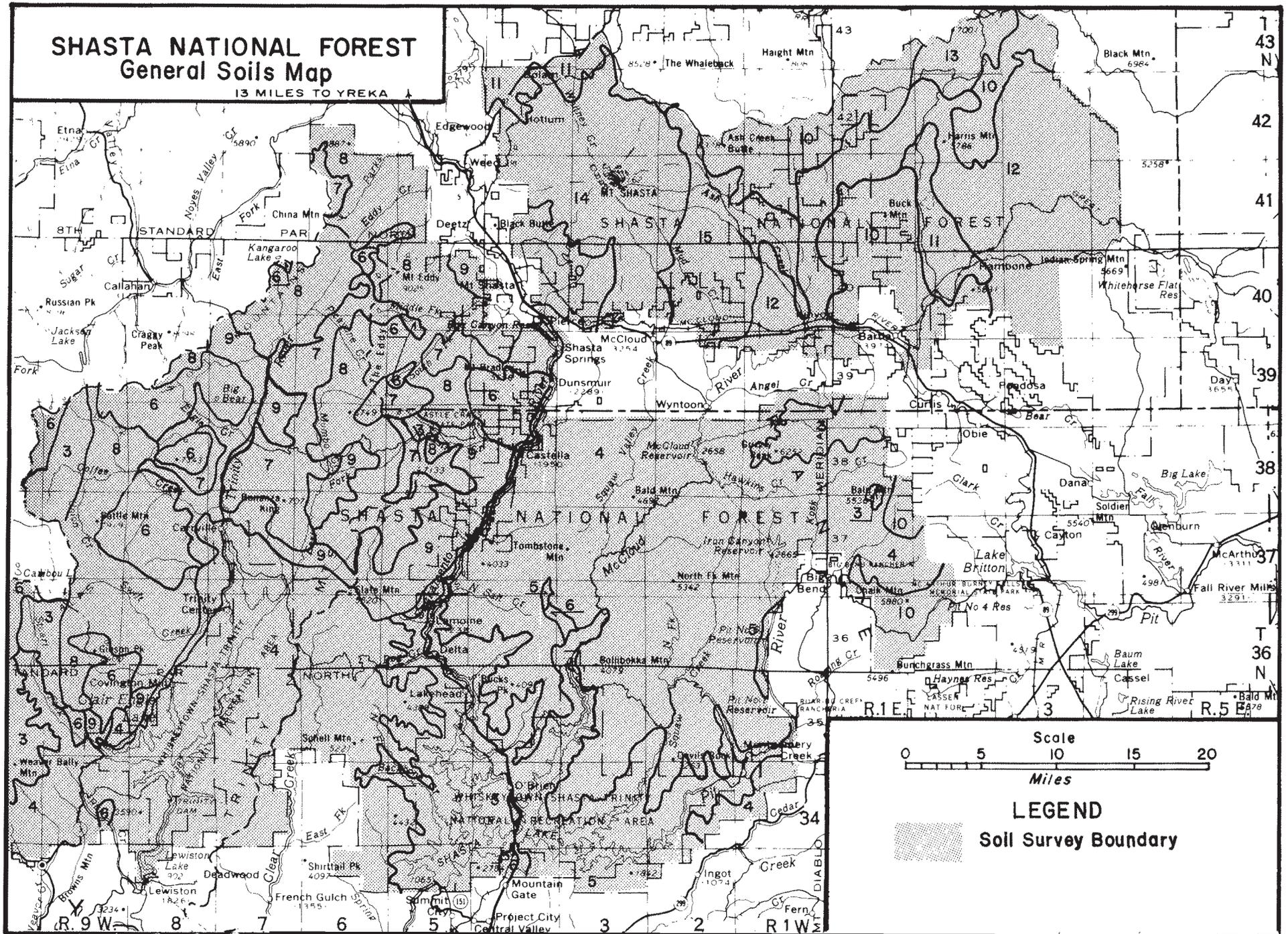


LEGEND

Soil Survey Boundary

SHASTA NATIONAL FOREST General Soils Map

13 MILES TO YREKA



Detailed Soil Map Units

The map units on the soil maps at the back of this report show the kind of soils in the survey area. Table 5 gives the acreage and proportionate extent of each map unit. Each map unit on the soil maps represents an area on the landscape and consists of one or more soils for which the unit is named. The map unit descriptions, which are in tabular format, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They can also be used to plan the management needed for those uses.

In this survey, the individual soils (components of map units) were recognized and classified to families or phases of families or to the subgroup level (see "Classification of the Soils"). Soils that have profiles somewhat alike make up a soil family. Soil families are established within a subgroup primarily on the basis of physical and chemical properties that affect use and management. Soils of a family can also differ in slope, wetness, or degree of erosion, and because of such differences, a family is divided into soil phases.

Many map units are made up of two or more major soils. These map units are called soil complexes or soil associations. A soil complex consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. A soil association is made up of two or more geographically associated soils that are shown as one unit on the maps.

Because of present or anticipated uses, it was considered impractical to map the soils separately. In addition, some map units include miscellaneous areas as components. Rock outcrop is an example; it has little or no soil and supports little or no vegetation.

Definitions and Criteria

The following are explanations of entries used in detailed soil map unit descriptions.

Map unit symbol and name. A numerical symbol is used to designate areas of each map unit on the soil maps. The symbol corresponds to the symbol preceding the map unit name in the map unit descriptions. The map unit name consists of soil components or miscellaneous areas or both.

Soil map unit components consist mostly of soil families, but may include subgroups or higher soil taxa and miscellaneous land types.

Approximate proportion is the approximate percentage of each soil component or miscellaneous land type making up the map unit.

Geomorphic Position section of the Mapping Unit Description relates the mapping unit to specific landforms such as steep sideslopes; gently sloping to slopes; or cinder cones. Mapping units are drawn on a map, in large part, on the basis of landform. Field checking identifies the soils found on that landform and the assumption is made that similar landforms will have similar soils.

Typical Vegetation Series is listed for each soil component. A series is a natural vegetation unit that has a common dominant species or set of species. In many cases, vegetative patterns are very reliable indicators of soil boundaries and can be used to predict the pattern of occurrence of associated soils.

Soil Profile Description is an abridged version of the more detailed soil profile descriptions in the section "Taxonomic Unit Descriptions". Included are the following layers:

Surface Layer. The uppermost part of the soil, ordinarily moved in tillage, or its equivalent in uncultivated soils; ranging in depth from 3 to 10 inches. Frequently designated as the "A horizon".

Subsoil. The soil between the surface layer and the uppermost substratum. The subsoil consists of all parts of the B horizon above a depth of 2 meters and any part of the A or C horizon between the surface layer and a depth of 1 meter or a more shallow substratum.

Substratum. A layer below a depth of 1 meter, or beneath the solum if the lower part of the solum is between 1 and 2 meters deep. Any part of the solum below 2 meters is considered substratum. Bedrock, hardpan and unconsolidated geologic materials that are in contrasting particle-size classes relative to the surface soil or solum are substratum regardless of depth, even within 1 meter of the ground surface.

Inclusion comprise the other kinds of soils in the map unit that are not named as a component part because they constitute to small a percentage of the unit.

Forest Survey Site Class. In order to have a common measure of productivity, the Forest Survey Site Class utilizes a seven class system where each class is defined in terms of a range of cubic foot yield at culmination of mean annual increment in unmanaged even-age stands. The site class was arrived at by first determining the site class using Duncan Dunning's Mixed Conifer Timber Site Class curves. The site index is then converted to the equivalent Forest Survey Site Class. In some instances, the site class was modified to reflect the true carrying capacity of the soil.

The chart below relates Duncan Dunning's Site Class, and site index, which expresses tree height at 100 years of age, conversion column to Forest Survey Site Class and the mean annual increment at culmination (cu. ft./ac./yr.). Dunning's Site Class VI is non-commercial.

Dunning's Site Class	Site Index Height/100 yrs	Forest Survey Site Class	MAI
I	175	3	120-164
II	102	4	85-119
III	80	5	50-85
IV	67	5	50-84
V	52	6	20-49
VI	--	7	<20

Adapted Species Group. The Adapted Species Group interpretation identifies the species of commercial trees that are normally adapted to that soil for that particular mapping unit.

Species	Symbol
Ponderosa pine	PP
Douglas-fir	DF
Sugar pine	SP
Jeffery pine	JP
Incense cedar	IC
Western white pine	WWP
White fir	WF
Red fir	RF
Logdgpole pine	LPP
Grassland	GL
Brushland	BL

Soil Erodibility. Many land use activities have the potential to cause erosion rates to exceed natural soil erosion or soil formation rates. Potential consequences of accelerated erosion include reductions in the productive capacity of the soil and adverse effects on water quality. Many interrelated factors are evaluated in an Erosion Hazard Rating (EHR) system to determine whether land use activities would cause accelerated erosion, and to what degree accelerated erosion would cause adverse effects. It is designed to appraise the relative risk of accelerated sheet and rill erosion. The system does not rate gully erosion, dry ravel, wind erosion or mass wasting.

The adjective erosion hazard ratings are described below in terms of the likelihood and consequences of accelerated erosion. As the risk of accelerated erosion increases, so does the likelihood that accelerated erosion will exceed soil formation rates. The risk and consequence becomes especially critical for shallow and moderately deep soils over consolidated materials.

The maximum EHR are based on little or no vegetative cover present and on the long-term average occurrence of 2-year, 6-hour storm events. Erosion hazard risks are greater when storm frequency, intensity and/or duration exceed long-term average occurrence, and risks are less when occurrence is below "average". The risks and consequences for adjective erosion hazard ratings are described below.

Low EHR. Accelerated erosion is not likely to occur, except in the upper part of the Low EHR numerical range, or during periods of above average storm occurrence. If accelerated erosion does occur, adverse effects on soil productivity and to nearby water quality are not expected. Erosion control measures are usually not needed for these areas.

Moderate EHR. Accelerated erosion is likely to occur in most years. Adverse effects on soil productivity (especially to shallow and moderately deep soils) and to nearby water quality may occur for the upper part of the Moderate EHR numerical range, or during periods of above average storm occurrence. The need for erosion control should be evaluated for these areas. A wide selection of measures and applications methods are available.

High EHR. Accelerated erosion will occur in most years. Adverse effects on soil productivity (especially to shallow and moderately deep soils) and to nearby water quality are likely to occur, especially during periods of above average storm occurrence. Erosion control is necessary for these areas to prevent accelerated erosion. The selection of measures and methods of application are somewhat limited.

Very High EHR. Accelerated erosion will occur in most years. Adverse effects on soil productivity and to nearby water quality are very likely to occur, even during periods of below average storm occurrence. Erosion control is essential for these areas to prevent accelerated erosion. The selection of measures and methods of application are limited.

Available Waterholding Capacity (AWC)

Available water-holding capacity (AWC) is that water held in a soil which is readily available to plant roots. It

is considered to be the difference between field capacity and permanent wilting point. Available water is, more often than not, the most limiting soil factor influencing seedling survival and site productivity potential. Ranges are calculated for the total profile and the top 24 inch depth. The AWC for profile depth is used as a measure of long term productivity potential. The value for 24 inches is used to assess seedling survival potential.

Seedling Survival Potential

This rating expresses the relative probability for realizing adequate stocking through the survival and establishment of planted seedlings of commercial conifer species. This probability is based primarily on the available water holding capacity (AWC) of the soil. It is distinguished from the "Plantability Potential" in that Seedling Survival Potential assesses the AWC of the soil to provide moisture for the survival of the tree, where as plantability is related to the physical factors that determine the suitability of effective planting operations.

With competing vegetation, adequate moisture appears to be the most limiting soil factor affecting the vigor and survival of the first year planted stock. Moisture supply is expressed in terms of the available water capacity (AWC) in that portion of the soil profile potentially utilized by the seedling root system during its first growing

season, i.e., the upper 20 inches. In this procedure, the AWC was computed according to the method presented in Soil Characteristics and Interpretations for Management. The control of competing vegetation is assumed.

High. AWC is greater than 3 inches. Almost all planted seedlings would survive.

Moderate. AWC ranges from 2.0 to 3.0 inches. Most planted seedlings would survive.

Low. The AWC ranges from 1.0 to 2.0 inches. The primary limiting factors of these soils are shallow soils and/or high percentage of rock fragments. Few planted seedling would survive.

Very Low. The AWC is less than 1.0 inch. The soils are shallow and have a very high rock fragment content. Very few planted seedling would survive.

Plantability Potential

Plantability is a measure of the degree of difficulty in physically planting containerized or 2-0 bare root stock. It is based on the percent stones in or on the surface horizon, adequate depth to rock or a restrictive layer and slope.

TABLE 2. - Plantability Potential

Criteria	Rating		
	High to Moderate	Low	Very Low ¹
Coarse fragments top 12" inches % of 2"+	<40%	40 to 60%	>60%
Soil Depth	>15"	14-12"	<12"
% Slope	<70%	70 to 80%	>80%

¹Very Low: is defined as not physically plantable under present technology or at a cost that would be prohibitive.

Hydrologic Soil Groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. The soils are grouped according to the intake of water when they are thoroughly wet and receive precipitation from long duration storms.

The four hydrologic soil groups are:

Group A. Low runoff potential. Soils having high rates of infiltration and water transmission when wet. They are mostly deep, well drained to excessively drained sands and gravels.

Group B. Moderately low runoff potential. Soils having moderate rates of infiltration and water transmission when wet. They are mostly moderately deep and deep, moderately well drained and well drained soils, moderately fine to moderately coarse textured and have moderately slow to moderately rapid permeability.

Group C. Moderately high runoff potential. Soils having slow rates of infiltration and water transmission when wet. They belong mostly to one of two general categories. Those in the first category are mostly well drained and moderately well drained soils that have a slowly or very slowly permeable layer (such as a claypan, hardpan or massive bedrock) at moderate depth (20-40 inches). Those soils in the second category generally have moderately fine or fine textures or a moderately high water table and may be somewhat poorly drained. This group also includes shallow soils over hard but highly fractured bedrock that allows moderate water transmission.

Group D. High runoff potential. Soils having very slow rates of infiltration and water transmission when

wet. They are mostly fine-textured soils that have high shrink-swell potential, soils that have a permanently high water table, soils that have a claypan or clay layer near the surface, or shallow soils over impervious material.

Potential For Roadbed Damage

The soils are classified as to their potential for roadbed deformation (rutting) due to traffic loading during wet conditions, resulting in subsequent rilling and gullyng of the roadbed. The categories are based on general soil characteristics which are intended to identify potential erosion and sedimentation requirements will need to be assessed at the project level, but may also include traffic management.

The ratings are assessed on observations and professional judgment based on the soil's characteristics and its behavior to deformation and overland flow. The characteristics assessed are soil depth, percent coarse fragments, and the percent clay.

Low - Native material is likely to provide a stable roadbed. The soils are shallow and/or have a very high rock content.

Moderate - Native material provides a moderately stable roadbed. Soils are moderately deep and have a high stone content, and are non-granitic.

High - These soils are frequently subject to rutting and subsequent gullyng during the wet season. They are deep clayey soils with few coarse fragments.

Very High - These soils are formed on deeply weathered granitics and are subject to severe gullyng.

I Andeptic Cryorthents, 10 to 40 percent slopes

Map Unit Components	Andeptic Cryorthents (75%)
Geomorphic Position	Gently sloping to moderately steep moraines, outwash slopes, mud flows.
Typical Vegetation Series	Upper Montane Mixed Chaparral, Scrub, and Conifer

Soil Profile Description

Surface Soil	0-34" grayish brown loamy sand to pale brown extremely cobbly sand, weak fine subangular blocky structures to massive, 5 to 65% gravels and cobbles, slightly acid to neutral.
Subsoil	
Substratum	34-44" light brownish gray extremely cobbly sand, massive, 65% cobbles and gravel, neutral. 44-60" extremely cobbly till.

Soil Properties & Management Interpretations

Forest Survey Site Class	6
Adapted Species Group	WF, RF, JP, WWP
Soil Erodibility	Low
AWC for Profile Depth	1.5-3.0
AWC for Surface 24"	0.4-1.5
Seedling Survival Potential	Low-Mod.
Plantability Potential	V. Low-High
Hydrologic Soil Group	A
Potential for Roadbed Damage	Moderate
Inclusions 25%	Rock outcrop Andic Cryumbrepts
Remarks:	Includes a broad range of recent volcanic soils, covered with ice or snow for up to 1/2 year.

2 Andeptic Cryorthents, 40 to 100 percent slopes

Map Unit Components **Andeptic Cryorthents (75%)**

Geomorphic Position Incised channels on ash deposits.

Typical Vegetation Series Shrub and Conifer

Soil Profile Description

Surface Soil 0-34" grayish brown loamy sand to pale brown extremely cobbly sand, weak fine subangular blocky structure to massive, 5 to 65% gravel and cobbles, slightly acid to neutral.

Subsoil

Substratum 34-44" light brownish gray extremely cobbly sand, massive, 65% cobbles and gravel, neutral.
44-60" extremely cobbly till.

Soil Properties & Management Interpretations

Forest Survey Site Class 6

Adapted Species Group WF, RF, JP, WWP

Soil Erodibility Low

AWC for Profile Depth 1.5-3.0

AWC for Surface 24" 0.4-1.5

Seedling Survival Potential Low-Mod.

Plantability Potential V.Low-High

Hydrologic Soil Group A

Potential for Roadbed Damage Moderate

Inclusions 25% Rock outcrop
Andic Cryumbrepts

Remarks: Mapped around Mud Creek canyon, Diller canyon and other extremely steep, unstable deposits of deep, recent volcanic ash.

3 Andic Cryumbrepts, 15 to 40 percent slopes

Map Unit Components	Andic Cryumbrepts (75%)
Geomorphic Position	Moderately steep volcanic outwash slopes.
Typical Vegetation Series	Upper Montane, Mixed Chaparral, Snowbrush, Chaparral, and Scrub

Soil Profile Description

Surface Soil	0-10" brown gravelly fine sandy loam and yellowish brown very gravelly loamy sand, single grain and massive, 25-55% gravel and cinders, moderately acid to neutral.
Subsoil	
Substratum	10-36" yellowish brown very gravelly to extremely gravelly and cobbly loamy sand, massive, 55-65% pebbles, cinders and cobbles, neutral to slightly acid.

Soil Properties & Management Interpretations

Forest Survey Site Class	6
Adapted Species Group	RF, JP, WWP
Soil Erodibility	Moderate
AWC for Profile Depth	1.1-1.7
AWC for Surface 24"	0.7-1.3
Seedling Survival Potential	V.Low-Low
Plantability Potential	V.Low-High
Hydrologic Soil Group	A
Potential for Roadbed Damage	Low
Inclusions 25%	Andeptic Cryorthents Rock outcrop, volcanic Rubble land Scorial deposits
Remarks:	Includes a very broad range of soils and rock landforms. These units are covered with ice and snow for up to half the year.

4 Andic Cryumbrepts, 15 to 40 percent slopes

Map Unit Components
 Geomorphic Position
 Typical Vegetation Series

Andic Cryumbrepts (50%)
 Gently to very steep volcanic mountain slopes and outwash slopes.
 Snowbrush Chaparral Shrub Very Open Red Fir - White Fir Forest

Dystric Cryopsamments (30%)
 Linear upper mountain slopes and glacial outwash flats.
 Very Open Red Fir - White Fir Forest

Soil Profile Description

Surface Soil
 Subsoil
 Substratum

0-10" brown gravelly fine sandy loam and yellowish brown very gravelly loamy sand, single grain and massive, 25-55% gravel and cinders, moderately acid to neutral.
 10-36" yellowish brown very gravelly to extremely gravelly and cobbly loamy sand, massive, 55-65% pebbles, cinders and cobbles, neutral to slightly acid.

0-7" very dark grayish brown to gray loamy sand, weak very fine granular structure to single grain, 4-5% gravel, strongly acid.
 7-17" light brownish gray loamy sand, weak very fine subangular blocky structure, 5% gravel, strongly acid.
 17-32" light gray gravelly sand, relict rock structure, 20% gravel, strongly acid.
 32-35" weathered granitic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class
 Adapted Species Group
 Soil Erodibility
 AWC for Profile Depth
 AWC for Surface 24"
 Seedling Survival Potential
 Plantability Potential
 Hydrologic Soil Group
 Potential for Roadbed Damage
 Inclusions 20%
 Remarks:

6	5
RF, JP, WWP	LPP, WF, RF, JP
Moderate	Moderate
1.1-1.7	2.4-3.1
0.7-1.3	1.2-1.7
V.Low-Low	V.Low-Low
V.Low-High	Moderate-High
A	A
Low	High
Rubble land Rock outcrop, volcanic	

Includes a very broad range of soils and rock contents. These units are covered with ice and snow for up to half the year.

5 Andic Cryumbrepts-Rock outcrop complex, 25 to 50 percent slopes

Map Unit Components	Andic Cryumbrepts (50%)	Rock outcrop (30%)
Geomorphic Position	Volcanic mountain and and outwash slopes.	Glacial moraines, lava flows, outwash channels.
Typical Vegetation Series	Snowbrush Chaparral Shrub	Shrub

Soil Profile Description

Surface Soil	0-10" brown gravelly fine sandy loam and yellowish brown very gravelly loamy sand, single grain and massive, 25-55% gravel and cinders, moderately acid to neutral.	
Subsoil		
Substratum	10-36" yellowish brown very gravelly to extremely gravelly and cobbly loamy sand, massive, 55-65% pebbles, cinders and cobbles, neutral to slightly acid.	Volcanic

Soil Properties & Management Interpretations

Forest Survey Site Class	6	
Adapted Species Group	RF, JP, WWP	
Soil Erodibility	Moderate	
AWC for Profile Depth	1.1-1.7	
AWC for Surface 24"	0.7-1.3	
Seedling Survival Potential	V.Low-Low	
Plantability Potential	V.Low-High	
Hydrologic Soil Group	A	D
Potential for Roadbed Damage	Low	Low
Inclusions 20%	Rubble land Dystric Cryopsamments	
Remarks:	Includes a very broad range of soils and rock landforms, mainly glacial deposits between moraines and lava ridges. These units are covered by snow and ice for up to half the year.	

6 Aquolls-Xerolls complex, 0 to 20 percent slopes

Map Unit Components	Aquolls (60%)	Xerolls (40%)
Geomorphic Position	Level to gently sloping benches, flats and basins.	Level to gently sloping benches, flats and basins.
Typical Vegetation Series	Upper Montane Wet Meadows and Seeps	Upper Montane, Dry Meadows

Soil Profile Description

Surface Soil	0-8" grayish brown gravelly loam, strong medium granular structure, 20% gravels, slightly acid.	0-9" brown gravelly sandy loam, strong medium granular structure, 25% gravel, slightly acid.
Subsoil	8-26" grayish brown gravelly silty clay loam, massive, 30% gravel, strongly acid.	9-27" yellowish brown gravelly silty clay loam, moderate medium subangular blocky structure, 40% gravel, strongly acid.
Substratum	26-37" light yellowish brown very cobbly clay loam, massive, 40% gravel and cobbles, strongly acid. 37-42" colluvial rock from mixed sources.	27-32" fractured metamorphic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	6	5
Adapted Species Group	GL	GL, LPP
Soil Erodibility	Low	Low
AWC for Profile Depth	SAT	3.5-5.7
AWC for Surface 24"	SAT	2.3-3.3
Seedling Survival Potential	Low	Low
Plantability Potential	Moderate-High	Moderate-Low
Hydrologic Soil Group	D	B
Potential for Roadbed Damage	High	Moderate

Inclusions

Remarks: Also includes seeps and springs, areas of high water table, very high variability.

7 Asta family, 5 to 40 percent slopes

Map Unit Components	Asta family (80%)
Geomorphic Position	Gentle to moderately steep, outwash terraces.
Typical Vegetation Series	Sierran-Cascade, Mixed Conifer Forest, Black Oak Forest

Soil Profile Description

Surface Soil	0-13" dark brown and brown gravelly sandy loam, weak fine granular to very weak medium subangular blocky structure, 25-30% gravel, strongly acid.
Subsoil	13-60" brown loam to strong brown silt loam, moderate, medium subangular blocky to relict rock structure, 5% gravel, strongly acid.
Substratum	60-71" strong brown silt loam, massive, strongly acid.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-4
Adapted Species Group	DF, PP, SP
Soil Erodibility	Moderate
AWC for Profile Depth	8.0-11.0
AWC for Surface 24"	2.5-3.1
Seedling Survival Potential	Moderate-High
Plantability Potential	High-Moderate
Hydrologic Soil Group	B
Potential for Roadbed Damage	High
Inclusions 20%	Sadie family, deep Neer family
Remarks:	Asta family: Site IA.

8 Atter family, 0 to 20 percent slopes

Map Unit Components	Atter family (75%)
Geomorphic Position	Gentle sloping terraces alluvial fans, and glacial outwash.
Typical Vegetation Series	Sierran-Cascade, Mixed Conifer Forest, White Alder, Riparian Woodland

Soil Profile Description

Surface Soil	0-15" brown and yellowish brown cobbly sandy loam, weak very fine granular and medium subangular blocky structure, 13-24% cobble and gravel, slightly acid.
Subsoil	
Substratum	15-66" light yellowish brown extremely cobbly loamy sand and very pale brown extremely stony sand, single grain, 80% cobbles, stones and gravel, slightly acid.

Soil Properties & Management Interpretations

Forest Survey Site Class	4-5
Adapted Species Group	DF, PP, SP
Soil Erodibility	Low
AWC for Profile Depth	1.9-3.2
AWC for Surface 24"	1.1-2.2
Seedling Survival Potential	V.Low-Low
Plantability Potential	High-Low
Hydrologic Soil Group	A
Potential for Roadbed Damage	Moderate
Inclusions 25%	Xerofluvents Riverwash
Remarks:	

9 Avis family, 0 to 20 percent slopes

Map Unit Components	Avis family (75%)
Geomorphic Position	Shallow entrenched drainages.
Typical Vegetation Series	Lodgepole Pine Forest

Soil Profile Description

Surface Soil	0-5" dark brown loamy coarse sand, weak medium subangular blocky structure, 10% gravel, neutral.
Subsoil	
Substratum	5-38" brown loamy sand to reddish brown extremely cobbly sandy loam, weak medium subangular blocky structure 10-80% gravel, neutral to slightly acid. 38-40" volcanic rock, glaciated.

Soil Properties & Management Interpretations

Forest Survey Site Class	6
Adapted Species Group	WF, SP, IC, PP
Soil Erodibility	Low
AWC for Profile Depth	1.3-2.6
AWC for Surface 24"	1.0-1.8
Seedling Survival Potential	Low
Plantability Potential	Moderate-High
Hydrologic Soil Group	B
Potential for Roadbed Damage	Low
Inclusions 25%	Delaney family, deep Revit family
Remarks:	Adapted specie is climatically determined, units are in a basin-like position which creates cold air drainage.

10 Avis family-Andic Cryumbrepts complex, 0 to 20 percent slopes

Map Unit Components	Avis family (75%)	Andic Cryumbrepts (30%)
Geomorphic Position	Gently sloping flanks of lava flows.	Gently sloping flanks of lava flows.
Typical Vegetation Series	Upper Montane, Mixed Chaparral, Mixed Conifer-Fir Forest	Upper Montane, Mixed Chaparral, Mixed Conifer-Fir Forest

Soil Profile Description

Surface Soil	0-5" dark brown loamy coarse sand, weak medium subangular blocky structure, 10% gravel, neutral.	0-10" brown gravelly fine sandy loam and yellowish brown very gravelly loamy sand, single grain and massive, 25-55% gravel and cinders, moderately acid to neutral.
Subsoil		
Substratum	5-38" brown loamy sand to reddish brown extremely cobbly sandy loam, weak medium subangular blocky structure 10-80% gravel, neutral to slightly acid. 38-40" volcanic rock, glaciated.	10-36" yellowish brown very gravelly to and cobbly loamy sand, massive, 55-65% pebbles, cinders and cobbles, neutral to slightly acid.

Soil Properties & Management Interpretations

Forest Survey Site Class	6	6
Adapted Species Group	WF, SP, IC, PP	RF, JP, WWP
Soil Erodibility	Low	Moderate
AWC for Profile Depth	1.3-2.6	1.1-1.7
AWC for Surface 24"	1.0-1.8	0.7-1.3
Seedling Survival Potential	Low-Moderate	Low-Moderate
Plantability Potential	Moderate-High	Moderate-High
Hydrologic Soil Group	B	A
Potential for Roadbed Damage	Low	Low
Inclusions 10%	Yallani family Delaney family, deep	
Remarks:		

11 Avis-Fons families association, 25 to 40 percent slopes

Map Unit Components
 Geomorphic Position
 Typical Vegetation Series

Avis family (60%)

Moderately sloping flanks of lava flows.
 White Fir Forest, Mixed Conifer - For Forest

Fons family (30%)

Moderately steep sideslopes on cinder cones.
 White Fir Forest, Upper Montane, Mixed Chaparral Knobcone Pine Forest

Soil Profile Description

Surface Soil

0-5" dark brown loamy coarse sand, weak medium subangular blocky structure, 10% gravel, neutral.

0-3" dark grayish brown sandy loam, single grain, 10% gravel medium acid.

Subsoil

3-21" brown sandy loam, strong, coarse and medium subangular blocky structure, 20-30% gravel and cinders, slightly acid.

Substratum

5-38" brown loamy sand to reddish brown extremely cobbly sandy loam, weak medium subangular blocky structure 10-80% gravel, neutral to slightly acid.
 38-40" volcanic rock, glaciated.

21-53" brown very cindery fine sandy loam, weak medium subangular blocky structure, 60-80% cinders, gravel and cobbles, neutral.

Soil Properties & Management Interpretations

Forest Survey Site Class

6

5

Adapted Species Group

WF, SP, IC, PP

DF, PP, SP, WF

Soil Erodibility

Low

Moderate

AWC for Profile Depth

1.3-2.6

2.1-3.1

AWC for Surface 24"

1.0-1.8

1.1-1.9

Seedling Survival Potential

Low-Moderate

Low-Moderate

Plantability Potential

Moderate-High

Moderate-High

Hydrologic Soil Group

B

A

Potential for Roadbed Damage

Low

Moderate

Inclusions 10%

Sheld family
 Cinder talus

Remarks:

Active cinder quarries on Fons family.

12 Beaughton family, 20 to 50 percent slopes

Map Unit Components	Beaughton family (75%)
Geomorphic Position	Mountain sideslopes and ridgetops.
Typical Vegetation Series	Serpentine Chaparral, Low Montane Serpentine Semi Barrens, Digger Pine Woodland

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, weak very fine granular and subangular blocky structure, 25% gravel, and cobbles, mildly alkaline.
Subsoil	3-16" reddish brown very cobbly clay loam and strong brown extremely cobbly clay, weak to moderate fine subangular blocky structure 50-60% gravel, cobbles and stones, mildly to moderately alkaline.
Substratum	16-21" highly fractured ultramafic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	7
Adapted Species Group	GL, BL
Soil Erodibility	Moderate
AWC for Profile Depth	1.6-2.1
AWC for Surface 24"	1.6-1.9
Seedling Survival Potential	V.Low-Low
Plantability Potential	Low-Moderate
Hydrologic Soil Group	D-C
Potential for Roadbed Damage	Low
Inclusions 25%	Dubakella family Lithic Haploxerafs Rock outcrop, ultramafics
Remarks:	Limitations: Beaughton family subject to Ca/Mg imbalance, toxicity and poor aeration.

13 Beaughton-Dubakella families complex, 20 to 40 percent slopes

Map Unit Components	Beaughton family (50%)	Dubakella family (30%)
Geomorphic Position	Moderately steep, linear, dissected mountain sideslopes.	Similar position as Beaughton family.
Typical Vegetation Series	Low Montane Serpentine Semi Barrens, Serpentine Chaparral, Digger Pine Woodland	Jeffrey Pine - Incense Cedar Woodland, Serpentine Chaparral

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, weak very fine granular and subangular blocky structure, 25% gravel, and cobbles, mildly alkaline.	0-11" reddish brown cobbly loam and very stony clay loam, weak and moderate very fine subangular blocky structure, 30 to 50% gravel, cobbles and stones, neutral.
Subsoil	3-16" reddish brown very cobbly clay loam and strong brown extremely cobbly clay, weak to moderate fine subangular blocky structure 50-60% gravel, cobbles and stones, mildly to moderately alkaline.	11-18" strong brown extremely stony clay, strong fine subangular blocky structure, 65% gravel and stones, mildly alkaline.
Substratum	16-21" highly fractured ultramafic rock.	18-26" strong brown extremely stony clay, massive, 85% gravel and stones, mildly alkaline, 26-30" ultramafic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	7	5-6
Adapted Species Group	GL, BL	JP, IC, DF
Soil Erodibility	Moderate	High
AWC for Profile Depth	1.6-2.1	1.8-4.2
AWC for Surface 24"	1.6-1.9	1.8-3.0
Seedling Survival Potential	V.Low-Low	Low-Moderate
Plantability Potential	Low-Moderate	Moderate
Hydrologic Soil Group	D-C	C
Potential for Roadbed Damage	Low	Moderate

Inclusions 20% Lithic Haploxeralfs
Rock outcrop, ultramafics

Remarks: Limitations: Beaughton and Dubakella families subject to Ca/Mg imbalance, toxicity and poor aeration.

14 Beaughton family-Rock outcrop complex, 50 to 80 percent slopes

Map Unit Components	Beaughton family (55%)	Rock outcrop (20%)
Geomorphic Position	Steep to very steep linear, mountain sideslopes and ridge tops.	Moderately steep to extremely steep mountain sideslopes and ridge tops.
Typical Vegetation Series	Serpentine Chaparral, Low Montane Serpentine Semi Barrens, Very Open Jeffrey Pine - Incense Cedar Woodland	

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, weak very fine granular and subangular blocky structure, 25% gravel, and cobbles, mildly alkaline.	
Subsoil	3-16" reddish brown very cobbly clay loam and strong brown extremely cobbly clay, weak to moderate fine subangular blocky structure 50-60% gravel, cobbles and stones, mildly to moderately alkaline.	
Substratum	16-21" highly fractured ultramafic rock.	Ultramafic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	7	
Adapted Species Group	GL, BL	
Soil Erodibility	Moderate	
AWC for Profile Depth	1.6-2.1	
AWC for Surface 24"	1.6-1.9	
Seedling Survival Potential	V.Low-Low	
Plantability Potential	Low-V. Low	
Hydrologic Soil Group	D-C	D
Potential for Roadbed Damage	Low	Low

Inclusions 25%
 Lithic Haploxerafs
 Dubakella family
 Dewmine family

Remarks: Beaughton family subject to Ca/Mg imbalance, toxicity and poor aeration.

15 Beughton-Weitchpec families complex, 20 to 40 percent slopes

Map Unit Components	Beughton family (55%)	Weitchpec family (25%)
Geomorphic Position	Moderately steep, dissected mountain sideslopes.	Moderately steep, dissected mountain sideslopes.
Typical Vegetation Series	Low Montane, Serpentine Semi Barrens, Serpentine Chaparral, Digger Pine Woodland	Jeffrey Pine - Incense Cedar Woodland, Serpentine Chaparral

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, weak very fine granular and subangular blocky structure, 25% gravel, and cobbles, mildly alkaline.	0-5" light gray gravelly loam, moderate fine and medium granular structure, 30% gravel, slightly acid.
Subsoil	3-16" reddish brown very cobbly clay loam and strong brown extremely cobbly clay, weak to moderate fine subangular blocky structure 50-60% gravel, cobbles and stones, mildly to moderately alkaline.	5-25" white to pale yellow very gravelly loam, moderate fine subangular blocky structure, 35-45% gravel, slightly acid to neutral.
Substratum	16-21" highly fractured ultramafic rock.	25-38" highly fractured ultramafic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	7	5-6
Adapted Species Group	GL, BL	JP, IC, DF
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	1.6-2.1	2.4-4.0
AWC for Surface 24"	1.6-1.9	2.0-2.7
Seedling Survival Potential	V.Low-Low	Low-Moderate
Plantability Potential	Moderate-Low	Moderate
Hydrologic Soil Group	D-C	B
Potential for Roadbed Damage	Low	Moderate

Inclusions 20%
 Dubakella family
 Rock outcrop
 Lithic Haploxeralfs

Remarks: Limitations: Beughton and Weitchpec families subject to Ca/Mg imbalance, toxicity and poor aeration.

16 Brader family, 40 to 60 percent slopes

Map Unit Components	Brader family (75%)
Geomorphic Position	Steep dissected mountain sideslopes.
Typical Vegetation Series	Greenleaf Manzanita Chaparral

Soil Profile Description

Surface Soil	0-11" yellowish brown gravelly loam, moderate fine and medium subangular blocky structure, 17% gravel, slightly acid.
Subsoil	11-19" yellowish brown gravelly heavy loam and light clay loam, moderate medium subangular blocky structure, 20-33% gravel, slightly to medium acid.
Substratum	19-27" highly weathered meta-andesite bedrock.

Soil Properties & Management Interpretations

Forest Survey Site Class	7
Adapted Species Group	BL
Soil Erodibility	Moderate
AWC for Profile Depth	2.0-2.8
AWC for Surface 24"	2.0-2.9
Seedling Survival Potential	V. Low-Low
Plantability Potential	Low
Hydrologic Soil Group	C
Potential for Roadbed Damage	High
Inclusions 25%	Hohmann family Neuns family Goulding family

Remarks:

17 Brader-Holland families association, 40 to 60 percent slopes

Map Unit Components	Brader family (60%)	Holland family (30%)
Geomorphic Position	Steep dissected mountain sideslopes.	Moderately steep, to steep mountain sideslopes.
Typical Vegetation Series	Greenleaf Manzanita Chaparral	Douglas-fir-Pine Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-11" yellowish brown gravelly loam, moderate fine and medium subangular blocky structure, 17% gravel, slightly acid.	0-3" brown gravelly loam, strong fine granular structure, 30% gravel, slightly acid.
Subsoil	11-19" yellowish brown gravelly heavy loam and light clay loam, moderate medium subangular blocky structure, 20-35% gravel, slightly to medium acid.	3-18" light brown gravelly loam and gravelly clay loam, weak fine and moderate medium subangular blocky structure, 20 to 30% gravel, slightly to medium acid.
Substratum	19-27" highly weathered meta-andesite bedrock. Andesite bedrock.	26-30" highly fractured, moderately weathered metavolcanic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	7	4-5
Adapted Species Group	BL	DF, PP, SP
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	2.0-2.8	3.0-4.4
AWC for Surface 24"	2.0-2.9	2.7-4.1
Seedling Survival Potential	V.Low-Low	Moderate
Plantability Potential	Low	Moderate
Hydrologic Soil Group	C	B
Potential for Roadbed Damage	High	High
Inclusions 10%	Lithic Haploxeralfs	
Remarks:		

18 Chaix family, 40 to 60 percent slopes

Map Unit Components	Chaix family (75%)
Geomorphic Position	Steep, dissected mountain sideslopes.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-10" dark grayish brown coarse sandy loam, strong medium and weak coarse granular structure, 5-13% gravel and cobbles, medium acid.
Subsoil	10-18" very pale brown cobbly coarse sandy loam, massive, 20% gravel and cobbles, medium acid.
Substratum	18-29" grayish brown gravelly loamy coarse sand, massive, 23% gravel and cobbles, medium acid. 29-32" weathered granitic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	5
Adapted Species Group	DF, PP, SP
Soil Erodibility	Moderate
AWC for Profile Depth	2.0-3.2
AWC for Surface 24"	1.6-2.5
Seedling Survival Potential	Moderate
Plantability Potential	High
Hydrologic Soil Group	B
Potential for Roadbed Damage	V. High
Inclusions 25%	Hugo family Chawanakee family Holland, granitic Ovall family

Remarks:

19 Chaix family, 60 to 80 percent slopes

Map Unit Components	Chaix family (75%)
Geomorphic Position	Very steep, dissected mountain sideslopes.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest, Upper Montane Mixed Chaparral

Soil Profile Description

Surface Soil	0-10" dark grayish brown coarse sandy loam, strong medium and weak coarse granular structure, 5-13% gravel and cobbles, medium acid.
Subsoil	10-18" very pale brown cobbly coarse sandy loam, massive, 20% gravel and cobbles, medium acid.
Substratum	18-29" grayish brown gravelly loamy coarse sand, massive, 23% gravel and cobbles, medium acid. 29-32" weathered granitic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	5
Adapted Species Group	DF, PP, SP
Soil Erodibility	Moderate
AWC for Profile Depth	2.0-3.2
AWC for Surface 24"	1.6-2.5
Seedling Survival Potential	Low-Moderate
Plantability Potential	Low
Hydrologic Soil Group	B
Potential for Roadbed Damage	V. High
Inclusions (25%)	Chawanakee family Rock outcrop - granitic Ovall family

Remarks:

20 Chaix-Chawanakee families complex, 60 to 80 percent slopes

Map Unit Components	Chaix family (50%)	Chawanakee family (30%)
Geomorphic Position	Dissected, very steep, linear, mountain sideslopes.	Dissected, very steep, linear, mountain sideslopes.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest, Upper Montane Mixed Chaparral	Upper Montane Mixed Chaparral Douglas-fir-Pine Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-10" dark grayish brown coarse and light brownish gray coarse sandy loam, strong medium and weak coarse granular structure, 5-13% gravel and cobbles, medium acid.	0-6" light brownish gravelly sandy loam and light gray gravelly loam, weak fine and medium subangular blocky structure 25-30% gravel and cobbles, very strongly acid.
Subsoil	10-18" very pale brown cobbly coarse sandy loam, massive, 20% gravel and cobbles, medium acid.	6-11" very pale brown cobbly loam, weak medium and coarse subangular blocky structure, 30% gravel and cobbles, very strongly acid.
Substratum	18-29" grayish brown gravelly loamy coarse sand, massive, 23% gravel and cobbles, medium acid. 29-32" weathered granitic rock.	11-20" highly fractured rhyolite bedrock.

Soil Properties & Management Interpretations

Forest Survey Site Class	5	6-7
Adapted Species Group	DF, PP, SP	BL, DF, PP, SP
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	2.0-3.2	1.1-1.6
AWC for Surface 24"	1.6-2.5	1.1-1.9
Seedling Survival Potential	Low-Moderate	Low
Plantability Potential	High	Low
Hydrologic Soil Group	B	C
Potential for Roadbed Damage	V. High	High
Inclusions (20%)	Ovall family Soils similar to Chaix family except very gravelly	

21 Chaix-Holland, granitic association, 50 to 80 percent slopes

Map Unit Components	Chaix family (60%)	Holland family, granitic (30%)
Geomorphic Position	Steep to very steep dissected mountain sideslopes.	Moderately steep to steep dissected mountain sideslopes.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest, Upper Montane Mixed Chaparral	Douglas-fir-Pine Conifer Forest

Soil Profile Description

Surface Soil	0-10" dark grayish brown coarse sandy loam, strong medium and weak coarse granular structure, 5-13% gravel and cobbles, medium acid.	0-15" light yellowish brown sandy loam and heavy coarse sandy loam, moderate fine and medium granular structure, to massive, 10 to 14% gravel and cobbles, medium acid.
Subsoil	10-18" very pale brown cobbly coarse sandy loam, massive, 20% gravel and cobbles, medium acid.	15-28" yellow gravelly sandy clay loam, massive, 17% gravel and cobbles, medium acid.
Substratum	18-29" grayish brown gravelly loamy coarse sand, massive, 23% gravel and cobbles, medium acid. 29-32" weathered granitic rock.	28-35" decomposed granitic rock, highly weathered. 35-45" slightly weathered diorite bedrock.

Soil Properties & Management Interpretations

Forest Survey Site Class	5	4-5
Adapted Species Group	DF, PP, SP	DF, PP, SP
Soil Erodibility	Moderate	High
AWC for Profile Depth	2.0-3.2	3.8-5.0
AWC for Surface 24"	1.6-2.5	2.4-3.0
Seedling Survival Potential	Low-Moderate	Moderate-High
Plantability Potential	High	High
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	V. High	V. High
Inclusions (10%)	Chawanakee family Ovall family	

22 Chaix-Hugo families, 20 to 40 percent slopes

Map Unit Components	Chaix family (60%)	Hugo family (30%)
Geomorphic Position	Moderately steep dissected mountain sideslopes.	Moderately steep dissected mountain sideslopes.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest, Upper Montane Mixed Chaparral	Douglas-fir-Pine Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-10" dark grayish brown and light brownish gray coarse sandy loam, strong medium and weak coarse granular structure, 5-13% gravel and cobbles, medium acid.	0-4" brown loam, weak very fine granular structure, 10% gravel, medium acid.
Subsoil	10-18" very pale brown cobbly coarse sandy loam, massive, 20% gravel and cobbles, medium acid.	4-50" light yellowish brown loam to pale brown gravelly sandy clay loam, weak to moderate fine subangular blocky structure, 10 to 30 percent gravel, medium to strongly acid.
Substratum	18-29" grayish brown gravelly loamy coarse sand, massive, 23% gravel and cobbles, medium acid. 29-32" weathered granitic rock.	50-68" highly fractured slightly to moderately weathered metasediments.

Soil Properties & Management Interpretations

Forest Survey Site Class	5	3-4
Adapted Species Group	DF, PP, SP	WF, PP, SP, DF
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	2.0-3.2	4.8-7.1
AWC for Surface 24"	1.6-2.5	3.1-3.9
Seedling Survival Potential	Low-Moderate	Low-Moderate
Plantability Potential	High	High
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	V. High	High
Inclusions (10%)	Chawanakee family Ovall family	

23 Chawanakee family, 60 to 80 percent slopes

Map Unit Components	Chawanakee family (75%)
Geomorphic Position	Dissected, very steep, linear mountain sideslopes.
Typical Vegetation Series	Low Montane & Foothill Mixed Chaparral, Mixed Conifer - Black Oak Forest

Soil Profile Description

Surface Soil	0-6" light brownish gravelly sandy loam and light gray gravelly loam, weak fine and medium subangular blocky structure 25-30% gravel and cobbles, very strongly acid.
Subsoil	6-11" very pale brown cobbly loam, weak medium and coarse subangular blocky structure, 30% gravel and cobbles, very strongly acid.
Substratum	11-20" highly fractured rhyolite bedrock.

Soil Properties & Management Interpretations

Forest Survey Site Class	6-7
Adapted Species Group	BL, DF, PP, SP
Soil Erodibility	Moderate
AWC for Profile Depth	1.1-1.6
AWC for Surface 24"	1.1-1.9
Seedling Survival Potential	Low
Plantability Potential	V.Low-Low
Hydrologic Soil Group	C
Potential for Roadbed Damage	High
Inclusions (25%)	Chaix family Rock outcrop, granitic

24 Chawanakee-Chaix families complex, 40 to 60 percent slopes

Map Unit Components	Chawanakee family (45%)	Chaix family (30%)
Geomorphic Position	Steep, linear, dissected mountain sideslopes.	Steep, linear, smooth dissected mountain oak slopes.
Typical Vegetation Series	Low Montane & Foothill Mixed Chaparral, Mixed Conifer - Black Oak Forest	Douglas-fir-Pine Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-6" light brownish gravelly sandy loam and light gray gravelly loam, weak fine and medium subangular blocky structure 25-30% gravel and cobbles, very strongly acid.	0-10" dark grayish brown and light brownish gray coarse sandy loam, strong medium and weak coarse granular structure, 5-13% gravel and cobbles, medium acid.
Subsoil	6-11" very pale brown cobbly loam, weak medium and coarse subangular blocky structure 30% gravel and cobbles, very strongly acid.	10-18" very pale brown cobbly coarse sandy loam, massive, 20% gravel and cobbles, medium acid.
Substratum	11-20" highly fractured rhyolite bedrock.	18-29" grayish brown gravelly loamy coarse sand, massive, 23% gravel and cobbles, medium acid. 29-32" weathered granitic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	6-7	5
Adapted Species Group	BL, DF, PP, SP	DF, PP, SP
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	1.1-1.6	2.0-3.2
AWC for Surface 24"	1.1-1.9	1.6-2.5
Seedling Survival Potential	Low	Low-Moderate
Plantability Potential	Low	Moderate-High
Hydrologic Soil Group	C	B
Potential for Roadbed Damage	High	V. High
Inclusions (25%)	Holland family, granitic Ovall family Rock outcrop, granitic	

25 Chawanakee-Chaix families complex, 60 to 80 percent slopes

Map Unit Components	Chawanakee family (60%)	Chaix family (30%)
Geomorphic Position	Very steep, dissected mountain sideslopes.	Very steep, dissected mountain sideslopes.
Typical Vegetation Series	Low Montane & Foothill Mixed Chaparral, Mixed Conifer - Black Oak Forest	Douglas-fir-Pine Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-6" light brownish gravelly sandy loam and light gray gravelly loam, weak fine and medium subangular blocky structure 25-30% gravel and cobbles, very strongly acid.	0-10" dark grayish brown and light brownish gray coarse sandy loam, strong medium and weak coarse granular structure, 5-13% gravel and cobbles, medium acid.
Subsoil	6-11" very pale brown cobbly loam, weak medium and coarse subangular blocky structure 30% gravel and cobbles, very strongly acid.	10-18" very pale brown cobbly coarse sandy loam, massive, 20% gravel and cobbles, medium acid.
Substratum	11-20" highly fractured rhyolite bedrock.	18-29" grayish brown gravelly loamy coarse sand, massive, 23% gravel and cobbles, medium acid. 29-32" weathered granitic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	6-7	5
Adapted Species Group	BL, DF, PP, SP	DF, PP, SP
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	1.1-1.6	2.0-3.2
AWC for Surface 24"	1.1-1.9	1.6-2.5
Seedling Survival Potential	Low	Moderate-Low
Plantability Potential	V.Low-Low	Low
Hydrologic Soil Group	C	B
Potential for Roadbed Damage	High	V. High
Inclusions (10%)	Ovall family Rock outcrop, granitic	

26 Chawanakee-Hugo families association, 60 to 80 percent slopes

Map Unit Components	Chawanakee family (60%)	Hugo family (30%)
Geomorphic Position	Very steep, dissected mountain sideslopes.	Very steep, dissected mountain sideslopes.
Typical Vegetation Series	Greenleaf Manzanita Chaparral, Mixed Conifer - Black Oak Forest	Douglas-fir-Pine Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-6" light brownish gravelly sandy loam and light gray gravelly loam, weak fine and medium subangular blocky structure 25-30% gravel and cobbles, very strongly acid.	0-4" brown loam, weak very fine granular structure, 10% gravel, medium acid.
Subsoil	6-11" very pale brown cobbly loam, weak medium and coarse subangular blocky structure 30% gravel and cobbles, very strongly acid.	4-50" light yellowish brown loam to pale brown gravelly sandy clay loam, weak to moderate fine subangular blocky structure, 10-30% gravel, medium to strongly acid.
Substratum	11-20" highly fractured rhyolite bedrock.	50-68" highly fractured slightly to moderately weathered metasediments.

Soil Properties & Management Interpretations

Forest Survey Site Class	6-7	3-4
Adapted Species Group	BL, DF, PP, SP	WF, PP, SP, DF
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	1.1-1.6	4.8-7.1
AWC for Surface 24"	1.1-1.9	3.1-3.9
Seedling Survival Potential	Low	High
Plantability Potential	V.Low-Low	High
Hydrologic Soil Group	C	B
Potential for Roadbed Damage	High	High
Inclusions (10%)	Chaix family Neuns family Rock outcrop, granitic Ovall family	

27 Chawanakee family-Rock outcrop complex, 60 to 80 percent slopes

Map Unit Components	Chawanakee family (60%)	Rock outcrop (30%)
Geomorphic Position	Very steep, dissected mountain sideslopes.	
Typical Vegetation Series	Low Montane & Foothill Mixed Chaparral, Mixed Conifer Black Oak Forest	

Soil Profile Description

Surface Soil	0-6" light brownish gravelly sandy loam and light gray gravelly loam, weak fine and medium subangular blocky structure 25-30% gravel and cobbles, very strongly acid.	
Subsoil	6-11" very pale brown cobbly loam, weak medium and coarse subangular blocky structure 30% gravel and cobbles, very strongly acid.	
Substratum	11-20" highly fractured rhyolite bedrock.	Granitic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	6-7	
Adapted Species Group	BL, DF, PP, SP	
Soil Erodibility	Moderate	
AWC for Profile Depth	1.1-1.6	
AWC for Surface 24"	1.1-1.9	
Seedling Survival Potential	Low	
Plantability Potential	V.Low-Low	
Hydrologic Soil Group	C	D
Potential for Roadbed Damage	High	Low
Inclusions (10%)	Chaix family Rubble land	

28 Copsey-Atter families association, 2 to 10 percent slopes

Map Unit Components	Copsey family (60%)	Atter family (35%)
Geomorphic Position	Gentle slopes on alluvial fans.	Moderate slopes on alluvial fans.
Typical Vegetation Series	Low to Mid Montane Sedge-Grass Meadows	Moderately open Jeffrey Pine Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-18" very dark brown and black clay, weak fine and strong medium subangular blocky structure, 5% gravel, slightly acid to neutral.	0-15" brown and yellowish brown cobbly sandy loam, weak very fine granular and medium subangular blocky structure, 13-24% cobble and gravel, slightly acid.
Subsoil		
Substratum	18-60" very dark gray to dark grayish brown gravelly clay, strong medium prismatic and subangular blocky structure, 20-27% gravel and cobbles, slightly acid.	15-66" light yellowish brown extremely cobbly loamy sand and very pale brown extremely stony sand, single grain, 80% cobbles, stones and gravel, slightly acid.

Soil Properties & Management Interpretations

Forest Survey Site Class	7	4-5
Adapted Species Group	GL	DF, PP, SP
Soil Erodibility	Moderate	Low
AWC for Profile Depth	6.0-7.3	1.9-3.2
AWC for Surface 24"	2.7-3.6	1.1-2.2
Seedling Survival Potential	Moderate-High	Low-Moderate
Plantability Potential	High-Moderate	High-Moderate
Hydrologic Soil Group	C-D	A
Potential for Roadbed Damage	High	Moderate
Inclusions (5%)	Riverwash	
Remarks:	Copsey limitations: Extremely heavy clay, limits conifer, also poorly drained.	

29 Coyata family, 0 to 20 percent slopes

Map Unit Components	Coyata family (80%)
Geomorphic Position	Stream terraces and swales.
Typical Vegetation Series	White Fir Forest, Mixed Conifer Forest, Ponderosa Pine Forest

Soil Profile Description

Surface Soil	0-10" brown fine sandy loam, weak very fine and fine subangular blocky structure, 10% gravel, slightly acid.
Subsoil	10-27" yellowish brown and dark yellowish brown gravelly fine sandy loam, weak fine to moderate medium subangular blocky structure, 15-30% gravel and cobbles, slightly acid.
Substratum	27-36" dark yellowish brown and yellowish brown very gravelly coarse loamy sand, weak fine subangular blocky structure, 60% gravel, slightly acid.

Soil Properties & Management Interpretations

Forest Survey Site Class	5
Adapted Species Group	GL, LPP, PP
Soil Erodibility	Moderate
AWC for Profile Depth	3.9-4.4
AWC for Surface 24"	2.6-3.2
Sedling Survival Potential	Moderate-High
Plantability Potential	Moderate-High
Hydrologic Soil Group	B
Potential for Roadbed Damage	Moderate
Inclusions (20%)	Sadie family, deep Ovall family, ponded Neer family Holland family, ashy
Remarks:	Seasonal high water table limits adapted species.

30 Deadfall family-Lithic Cryochrepts, 40 to 60 percent slopes

Map Unit Components	Deadfall family (60%)	Lithic Cryochrepts (30%)
Geomorphic Position	Steep, linear to broken ridge tops.	Similar position as Deadfall family.
Typical Vegetation Series	Upper Montane Serpentine Semi-Barrens	Similar vegetation as Deadfall family.

Soil Profile Description

Surface Soil	0-14" pale brown and yellowish brown very gravelly sandy loam, moderate to weak fine and very fine granular structure, 35-45% gravel and cobbles, slightly acid to neutral.	0-7" very pale brown gravelly sandy loam, moderate fine and very fine subangular blocky structure, 40% gravel, neutral.
Subsoil	14-24" yellowish brown extremely gravelly sandy loam, weak very fine granular structure, 75% gravel and cobbles, mildly alkaline.	7-17" pale brown very gravelly sandy clay loam, weak fine subangular blocky structure, 50% gravel, mildly alkaline.
Substratum	24-34" highly fractured ultramafic rock with coatings of soil. 34-40" ultramafic rock.	17-20" highly fractured moderately weathered ultramafic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	7	7
Adapted Species Group	GL	GL
Soil Erodibility	Low	Low
AWC for Profile Depth	0.9-1.5	0.8-2.0
AWC for Surface 24"	0.9-1.5	0.8-1.9
Seedling Survival Potential	V.Low-Low	V.Low-Low
Plantability Potential	High-Moderate	High-Moderate
Hydrologic Soil Group	A-B	D
Potential for Roadbed Damage	Moderate	Low

Inclusions (10%)
 Rock outcrop, ultramafic
 Rubble land, ultramafic

Remarks: Deadfall and Lithic Cryochrepts, ultramafic limitations: Ca/Mg imbalance, possible toxicity, poor aeration and extreme cold.

31 Deadfall family-Rock outcrop complex, 50 to 80 percent slopes

Map Unit Components	Deadfall family (45%)	Rock outcrop (30%)
Geomorphic Position	Steep to very steep ridge tops.	Similar position as Deadfall family.
Typical Vegetation Series	Scree/Conifer Upper Montane Serpentine Semi Barrens	

Soil Profile Description

Surface Soil	0-14" pale brown and yellowish brown very gravelly sandy loam, moderate to weak fine and very fine granular structure, 35-45% gravel and cobbles, slightly acid to neutral.
Subsoil	14-24" yellowish brown extremely gravelly sandy loam, weak very fine granular structure, 75% gravel and cobbles, mildly alkaline.
Substratum	24-34" highly fractured ultramafic rock with coatings of soil. 34-40" ultramafic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	7	
Adapted Species Group	GL	
Soil Erodibility	Low	
AWC for Profile Depth	0.9-1.5	
AWC for Surface 24"	0.9-1.5	
Seedling Survival Potential	V.Low-Low	
Plantability Potential	Low	
Hydrologic Soil Group	A-B	D
Potential for Roadbed Damage	Moderate	Low
Inclusions (25%)	Lithic Cryochrepts Rubble land, ultramafic	
Remarks:	Deadfall limitations: Ca/Mg imbalance, possible toxicity, poor aeration and extreme cold.	

32 Deadwood family, 40 to 60 percent slopes

Map Unit Components	Deadwood family (75%)
Geomorphic Position	Steep, dissected linear mountain sideslopes.
Typical Vegetation Series	Open Mixed Conifer-Canyon Oak Forest, Canyon Oak Woodland, Greenleaf Manzanita Chaparral

Soil Profile Description

Surface Soil	0-3" dark brown very gravelly, sandy loam, weak fine granular structure, 55% gravel, neutral.
Subsoil	3-15" yellowish brown and light brown very gravelly loam and extremely cobbly heavy loam, weak fine and medium subangular blocky structure, 55 to 65% gravel and cobbles, slightly to medium acid.
Substratum	15-17" metamorphosed shale, moderately fractured, slightly weathered.

Soil Properties & Management Interpretations

Forest Survey Site Class	6-7
Adapted Species Group	DF, PP, SP, BL
Soil Erodibility	Low
AWC for Profile Depth	0.9-1.5
AWC for Surface 24"	0.9-1.5
Seedling Survival Potential	V.Low-Low
Plantability Potential	V.Low-Low
Hydrologic Soil Group	C
Potential for Roadbed Damage	Low
Inclusions (25%)	Rock outcrop, metamorphic Neuns family Typic Xerorthents Goulding family Etsel family

33 Deadwood family, 60 to 80 percent slopes

Map Unit Components	Deadwood family (75%)
Geomorphic Position	Very steep, dissected mountain sideslopes, ridgetops.
Typical Vegetation Series	Open Mixed Conifer-Canyon Oak Forest, Canyon Oak Woodland, Greenleaf Manzanita Chaparral

Soil Profile Description

Surface Soil	0-3" dark brown very gravelly, sandy loam, weak fine granular structure, 55% gravel, neutral.
Subsoil	3-15" yellowish brown and light brown very gravelly loam and extremely cobbly heavy loam, weak fine and medium subangular blocky structure, 55 to 65% gravel and cobbles, slightly to medium acid.
Substratum	15-17" metamorphosed shale, moderately fractured, slightly weathered.

Soil Properties & Management Interpretations

Forest Survey Site Class	6-7
Adapted Species Group	DF, PP, SP, BL
Soil Erodibility	Low
AWC for Profile Depth	0.9-1.5
AWC for Surface 24"	0.9-1.5
Seedling Survival Potential	V.Low-Low
Plantability Potential	V.Low-Low
Hydrologic Soil Group	C
Potential for Roadbed Damage	Low
Inclusions (25%)	Typic Xerorthents, Goulding family Neuns family Rock outcrop, metamorphic

34 Deadwood Neuns families complex, 20 to 40 percent slopes

Map Unit Components	Deadwood family (60%)	Neuns family (30%)
Geomorphic Position	Moderately steep, dissected mountain sideslopes.	Moderately steep, dissected mountain sideslopes.
Typical Vegetation Series	Open Mixed Conifer-Canyon Oak Forest, Canyon Oak Woodland, Upper Montane Mixed Chaparral	Douglas-fir-Pine, Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-3" dark brown very gravelly, sandy loam, weak fine granular structure, 55% gravel, neutral.	0-11" brown to light brown very gravelly sandy loam, weak to moderate medium granular structure, 35-45% gravel, slightly acid.
Subsoil	3-15" yellowish brown and light brown very gravelly loam and extremely cobbly heavy loam, weak fine and medium subangular blocky structure, 55 to 65% gravel and cobbles, slightly to medium acid.	11-23" light brown very gravelly sandy loam, moderate fine subangular blocky structure, 55% gravel and cobbles, slightly acid.
Substratum	15-17" metamorphosed shale, moderately fractured, slightly weathered.	23-34" highly fractured, slightly weathered metamorphic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	6-7	5
Adapted Species Group	DF, PP, SP, BL	DF, PP, SP
Soil Erodibility	Low	Low
AWC for Profile Depth	0.9-1.5	0.9-1.5
AWC for Surface 24"	0.9-1.5	2.3-4.8
Seedling Survival Potential	V.Low-Low	Low-High
Plantability Potential	V.Low-Low	Moderate-High
Hydrologic Soil Group	C	B
Potential for Roadbed Damage	Low	Moderate
Inclusions (10%)	Typic Xerorthents, Goulding family Hugo family, moderately deep Rock outcrop, metamorphic	

35 Deadwood Neuns families complex, 40 to 60 percent slopes

Map Unit Components	Deadwood family (60%)	Neuns family (30%)
Geomorphic Position	Steep, dissected mountain sideslopes.	Steep, dissected mountain sideslopes.
Typical Vegetation Series	Open Mixed Conifer-Canyon Oak Forest, Canyon Oak Woodland, Upper Montane Mixed Chaparral	Douglas-fir-Pine, Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-3" dark brown very gravelly, sandy loam, weak fine granular structure, 55% gravel, neutral.	0-11" brown to light brown very gravelly sandy loam, weak to moderate medium granular structure, 35-45% gravel, slightly acid.
Subsoil	3-15" yellowish brown and light brown very gravelly loam and extremely cobbly heavy loam, weak fine and medium subangular blocky structure, 55 to 65% gravel and cobbles, slightly to medium acid.	11-23" light brown very gravelly sandy loam, moderate fine subangular blocky structure, 55% gravel and cobbles, slightly acid.
Substratum	15-17" metamorphosed shale, moderately fractured, slightly weathered.	23-34" highly fractured, slightly weathered metamorphic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	6-7	5
Adapted Species Group	DF, PP, SP, BL	DF, PP, SP
Soil Erodibility	Low	Low
AWC for Profile Depth	0.9-1.5	2.3-4.8
AWC for Surface 24"	0.9-1.5	1.6-3.2
Seedling Survival Potential	V.Low-Low	Low-High
Plantability Potential	Low	High-Moderate
Hydrologic Soil Group	C	B
Potential for Roadbed Damage	Low	Moderate
Inclusions (10%)	Typic Xerorthents, Goulding family Rock outcrop, metamorphic Rubble land Marpa family	

36 Deadwood Neuns families complex, 60 to 80 percent slopes

Map Unit Components	Deadwood family (40%)	Neuns family (35%)
Geomorphic Position	Very steep, highly dissected linear mountain sideslopes and ridge tops.	Very steep, highly dissected linear mountain sideslopes and ridge tops.
Typical Vegetation Series	Open Mixed Conifer-Canyon Oak Forest, Upper Montane Mixed Chaparral	Douglas-fir-Pine, Mixed Conifer Forest, Knobcone Forest

Soil Profile Description

Surface Soil	0-3" dark brown very gravelly, sandy loam, weak fine granular structure, 55% gravel, neutral.	0-11" brown to light brown very gravelly sandy loam, weak to moderate medium granular structure, 35-45% gravel, slightly acid.
Subsoil	3-15" yellowish brown and light brown very gravelly loam and extremely cobbly heavy loam, weak fine and medium subangular blocky structure, 55 to 65% gravel and cobbles, slightly to medium acid.	11-23" light brown very gravelly sandy loam, moderate fine subangular blocky structure, 55% gravel and cobbles, slightly acid.
Substratum	15-17" metamorphosed shale, moderately fractured, slightly weathered.	23-34" highly fractured, slightly weathered metamorphic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	6-7	5
Adapted Species Group	DF, PP, SP, BL	DF, PP, SP
Soil Erodibility	Low	Low
AWC for Profile Depth	0.9-1.5	2.3-4.8
AWC for Surface 24"	0.9-1.5	1.6-3.2
Seedling Survival Potential	V.Low-Low	Low-High
Plantability Potential	Low	Low
Hydrologic Soil Group	C	B
Potential for Roadbed Damage	Low	Moderate
Inclusions (25%)	Typic Xerorthents, Rock outcrop, metamorphic Rubble land Marpa family Hugo family, moderately deep	

37 Deadwood family-Rock outcrop complex, 60 to 80 percent slopes

Map Unit Components	Deadwood family (60%)	Rock outcrop (30%)
Geomorphic Position	Very steep, dissected mountain sideslopes.	Very steep, mountain sideslopes.
Typical Vegetation Series	Canyon Oak Woodland Greenleaf Manzanita Chaparral	Low Montane, Rockland/Shrub

Soil Profile Description

Surface Soil	0-3" dark brown very gravelly, sandy loam, weak fine granular structure, 55% gravel, neutral.
Subsoil	3-15" yellowish brown and light brown very gravelly loam and extremely cobbly heavy loam, weak fine and medium subangular blocky structure, 55 to 65% gravel and cobbles, slightly to medium acid.
Substratum	15-17" metamorphosed shale, moderately fractured, slightly weathered.

Soil Properties & Management Interpretations

Forest Survey Site Class	6-7	
Adapted Species Group	DF, PP, SP, BL	
Soil Erodibility	Low	
AWC for Profile Depth	0.9-1.5	
AWC for Surface 24"	0.9-1.5	
Seedling Survival Potential	V.Low-Low	
Plantability Potential	Low-V. Low	
Hydrologic Soil Group	C	D
Potential for Roadbed Damage	Low	Low
Inclusions (10%)	Typic Xerorthents, Rubble land	

38 Deadwood family-Typic Xerorthents-Rock outcrop complex, 60 to 80 percent slopes

Map Unit Components	Deadwood family (40%)	Typic Xerorthents (35%)	Rock outcrop (15%)
Geomorphic Position	Very steep, highly dissected, and ridge tops.	Topographical position similar to that described for Deadwood family	Concentrated on linear, mountain sideslopes but not confined to ridges on topography as described for Deadwood family.
Typical Vegetation Series	Mixed Conifer, Canyon Oak Forest, Canyon Oak Woodland	Mixed Conifer, Canyon Oak Forest, Canyon Oak Woodland	

Soil Profile Description

Surface Soil	0-3" dark brown very gravelly, sandy loam, weak fine granular structure, 55% gravel, neutral.	0-15" light brownish gray to light yellowish brown extremely gravelly loam, single grain, 75 to 85% gravel and cobbles, neutral.
Subsoil	3-15" yellowish brown and light brown very gravelly loam and extremely cobbly heavy loam, weak fine and medium subangular blocky structure, 55 to 65% gravel and cobbles, slightly to medium acid.	
Substratum	15-17" metamorphosed shale, moderately fractured, slightly weathered.	15-48" fragmental gravel and cobbles.

Soil Properties & Management Interpretations

Forest Survey Site Class	6-7	6-7	
Adapted Species Group	DF, PP, SP, BL	BL, DF, PP, SP	
Soil Erodibility	Low	Low	
AWC for Profile Depth	0.9-1.5	0.6-2.1	
AWC for Surface 24"	0.9-1.5	0.2-1.7	
Seedling Survival Potential	V.Low-Low	V.Low-Low	
Plantability Potential	Low-V. Low	Low-V. Low	
Hydrologic Soil Group	C	B	D
Potential for Roadbed Damage	Low	Low	Low
Inclusions (10%)	Neuns family		

39 Delaney family 0 to 35 percent slopes

Map Unit Components

Delaney family (75%)

Geomorphic Position

Outwash flats gently sloping to steep slopes of volcanoes and volcanic buttes, mudflows.

Typical Vegetation Series

Sagebrush Scrub Western Juniper Woodland

Soil Profile Description

Surface Soil

0-14" grayish brown loamy sand to light brownish gray sand, single grain to massive, 5-10% pumice gravel, medium acid.

Subsoil

Substratum

14-23" pale brown sand, massive,
15% 20 gravel, neutral.
23-24" fractured unweathered basalt.

Soil Properties & Management Interpretations

Forest Survey Site Class

7

Adapted Species Group

BL

Soil Erodibility

Low

AWC for Profile Depth

0.8-2.4

AWC for Surface 24"

0.9-1.5

Seedling Survival Potential

V.Low-Low

Plantability Potential

Moderate-High

Hydrologic Soil Group

C

Potential for Roadbed Damage

High

Inclusions (25%)

Delaney family, deep
Avis family

40 Delaney family, deep-Delaney family complex, 0 to 20 percent

Map Unit Components	Delaney family (60%)	Delaney family (30%)
Geomorphic Position	Gently sloping mudflows.	Gently sloping mudflows.
Typical Vegetation Series	Greenleaf Manzanita Chaparral, Sagebrush Scrub Western Juniper Woodland	Greenleaf Manzanita Chaparral Sagebrush Scrub

Soil Profile Description

Surface Soil	0-13" grayish brown sand, very weak fine granular structure to massive, 15% gravel, medium acid.	0-14" grayish brown loamy sand to light brownish gray sand, single grain to massive,, 5-10% pumice gravel, medium acid.
Subsoil		
Substratum	13-68" pale brown to white sand, massive to single grain, 10-25% gravel, medium acid.	14-23" pale brown sand, massive, 15% gravel, neutral. 23-24" fractured unweathered basalt.

Soil Properties & Management Interpretations

Forest Survey Site Class	7	7
Adapted Species Group	BL	BL
Soil Erodibility	Moderate	Low
AWC for Profile Depth	2.5-3.8	0.8-2.4
AWC for Surface 24"	1.0-1.8	0.9-1.5
Seedling Survival Potential	V.Low	V. Low
Plantability Potential	Moderate-High	Moderate-High
Hydrologic Soil Group	A	C
Potential for Roadbed Damage	High	High
Inclusions (10%)	Rock outcrop, volcanic Avis family	

41 Dewmine-Kang families association, 50 to 70 percent slopes

Map Unit Components	Dewmine family (50%)	Kang family (25%)
Geomorphic Position	Steep to very steep, highly dissected, lower mountain slopes.	Landforms similar to that described for Dewmine family.
Typical Vegetation Series	Low Montane Serpentine Semi-Barrens, Very Open Jeffrey Incense Cedar Woodland	Jeffrey Pine Mixed Conifer Forest, Jeffrey Pine - Incense Cedar Woodland

Soil Profile Description

Surface Soil	0-5" very dark gray gravelly loam and dark gray very gravelly clay loam, moderate very fine granular and moderate medium subangular blocky structure, 25-35% gravel and cobbles, slightly acid to neutral.	0-6" very dark gray gravelly clay loam, moderate fine granular to strong coarse subangular blocky structure, 10 to 25% gravel and cobbles, neutral to mildly alkaline.
Subsoil	5-19" dark grayish brown very gravelly clay loam and yellowish brown very gravelly clay, moderate medium and weak coarse subangular blocky structure, 35-50% gravel and cobbles, mildly alkaline.	6-19" very dark gray gravelly clay and olive brown very gravelly clay, strong coarse and medium subangular blocky structure, 35 to 50% gravel and cobbles, mildly alkaline.
Substratum	19-24" highly fractured serpentinitic rock.	19-28" olive brown extremely cobbly clay, relict rock structure, 70% gravel and cobbles, mildly alkaline. 28-30" fractured, weathered serpentinized peridotite.

Soil Properties & Management Interpretations

Forest Survey Site Class	7	5-7
Adapted Species Group	BL	JP, IC, DF
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	2.0-2.3	1.6-3.8
AWC for Surface 24"	2.0-2.3	2.3-2.9
Seedling Survival Potential	Low-Moderate	Moderate
Plantability Potential	Low	High-Low
Hydrologic Soil Group	D	C-D
Potential for Roadbed Damage	Moderate	Moderate
Inclusions (25%)	Dubakella family Beaughton family Shadeleaf family	
Remarks:	Dewmine and Kang limitations: Ca/Mg imbalance, possible toxicity and poor aeration.	

42 Dewmine family-Rock outcrop-Kang family association, 35 to 80 percent slopes

Map Unit Components	Dewmine family (30%)	Rock outcrop (30%)	Kang family (25%)
Geomorphic Position	Moderately steep to very broken mountain sideslopes.	Similar position as Dewmine family.	Moderately steep, dissected, linear, to steep, dissected, linear, mountain sideslopes and ridge tops.
Typical Vegetation Series	Mountain Mahogany Scrub, Pine -		Jeffrey Pine, Occasionally very Open Jeffrey Woodland, Jeffrey Pine, Mixed Conifer Incense Cedar WoodlandForest.

Soil Profile Description

	Dewmine family (30%)	Rock outcrop (30%)	Kang family (25%)
Surface Soil	0-5" very dark gray gravelly loam and dark gray very gravelly clay loam, moderate very fine granular and moderate medium subangular blocky structure, 25-35% gravel and cobbles, slightly acid to neutral.		0-6" very dark gravelly clay loam, moderate fine granular to strong coarse subangular blocky structure, 10-25% gravel and cobbles, neutral to mildly alkaline.
Subsoil	5-19" dark grayish brown very gravelly clay, moderate medium and weak gravel and cobbles, mildly alkaline. cobbles, mildly alkaline.		6-19" very dark gray gravelly clay and yellowish gravelly clay and olive brown very gravelly clay, strong subangular blocky coarse and medium subangular blocky structure, 35-50% gravel and cobbles, mildly alkaline.
Substratum	19-24" highly fractured serpentinitic rock.		19-28" olive brown extremely cobbly clay, relict rock structure, 70% gravel and cobbles, mildly alkaline. 28-30" fractured, weathered serpentinitized

Soil Properties & Management Interpretations

	Dewmine family (30%)	Rock outcrop (30%)	Kang family (25%)
Forest Survey Site Class	7		5-7
Adapted Species Group	BL		JP, IC, DF
Soil Erodibility	Moderate		Moderate
AWC for Profile Depth	2.0-2.3		1.6-3.8
AWC for Surface 24"	2.0-2.3		2.3-2.9
Seedling Survival Potential	Low-Moderate		Moderate
Plantability Potential	V.Low		V.Low
Hydrologic Soil Group	D	D	C-D
Potential for Roadbed Damage	Moderate Moderate	Low	
Inclusions (15%)	Grell family		
Remarks:	Dewmine and Kang limitations: Ca/Mg imbalance, possible toxicity and poor aeration.		

43 Dubakella family, 20 to 40 percent slopes

Map Unit Components	Dubakella family (75%)
Geomorphic Position	Moderately steep, mountain sideslopes.
Typical Vegetation Series	Jeffrey Pine - Incense Cedar Woodland, Serpentine Chaparral

Soil Profile Description

Surface Soil	0-11" reddish brown cobbly loam and very stony clay loam, weak and moderate very fine subangular blocky structure, 30 to 50% gravel, cobbles and stones, neutral.
Subsoil	11-18" strong brown extremely stony clay, strong fine subangular blocky structure, 65% gravel and stones, mildly alkaline.
Substratum	18-26" strong brown extremely stony clay, massive, 85% gravel and stones, mildly alkaline, 26-30" ultramafic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	5-6
Adapted Species Group	JP, IC, DF
Soil Erodibility	High
AWC for Profile Depth	1.8-4.2
AWC for Surface 24"	1.8-3.0
Seedling Survival Potential	Low-Moderate
Plantability Potential	High-Moderate
Hydrologic Soil Group	C
Potential for Roadbed Damage	Moderate
Inclusions (25%)	Rock outcrop, ultramafic Weitchpec family Henneke family Beaughton family Grell
Remarks:	Ca/Mg imbalance will limit species and growth on ultramafic soils.

44 Dubakella family, 40 to 60 percent slopes

Map Unit Components	Dubakella family (75%)
Geomorphic Position	Steep, mountain sideslopes.
Typical Vegetation Series	Jeffrey Pine - Incense Cedar Woodland, Serpentine Chaparral

Soil Profile Description

Surface Soil	0-11" reddish brown cobbly loam and very stony clay loam, weak and moderate very fine subangular blocky structure, 30 to 50% gravel, cobbles and stones, neutral.
Subsoil	11-18" strong brown extremely stony clay, strong fine subangular blocky structure, 65% gravel and stones, mildly alkaline.
Substratum	18-26" strong brown extremely stony clay, massive, 85% gravel and stones, mildly alkaline, 26-30" ultramafic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	5-6
Adapted Species Group	JP, IC, DF
Soil Erodibility	High
AWC for Profile Depth	1.8-4.2
AWC for Surface 24"	1.8-3.0
Seedling Survival Potential	Low-Moderate
Plantability Potential	High-Moderate
Hydrologic Soil Group	C
Potential for Roadbed Damage	Moderate
Inclusions (25%)	Rock outcrop, ultramafic Weitchpec family Henneke family Beaughton family Grell family
Remarks:	Ca/Mg imbalance will limit species and growth on ultramafic soils.

45 Dubakella-Beaughton families, 30 to 70 percent slopes

Map Unit Components	Dubakella family (50%)	Beaughton family (30%)
Geomorphic Position	Moderately steep to steep, broken mountain sideslopes and benches.	Ridge tops, steep mountain sideslopes.
Typical Vegetation Series	Jeffrey Pine - Incense Cedar Woodland, Serpentine Chaparral	Serpentine Chaparral Low Montane Serpentine Semi-Barrens

Soil Profile Description

Surface Soil	0-11" reddish brown cobbly loam and very stony clay loam, weak and moderate very fine subangular blocky structure, 30 to 50% gravel, cobbles and stones, neutral.	0-3" brown gravelly loam, weak very fine granular and subangular blocky structure, 25% gravel, and cobbles, mildly alkaline.
Subsoil	11-18" strong brown extremely stony clay, strong fine subangular blocky structure, 65% gravels and stones, mildly alkaline.	3-16" reddish brown very cobbly clay loam and strong brown extremely cobbly clay, weak to moderate fine subangular blocky structure 50-60% gravel, cobbles and stones, mildly to moderately alkaline.
Substratum	18-26" strong brown extremely stony clay, massive, 85% gravel and stones, mildly alkaline, 26-30" ultramafic rock.	16-21" highly fractured ultramafic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	5-6	7
Adapted Species Group	JP, IC, DF	GL, BL
Soil Erodibility	High	Moderate
AWC for Profile Depth	1.8-4.2	1.6-2.1
AWC for Surface 24"	1.8-3.0	1.6-1.9
Seedling Survival Potential	Low-Moderate	Low
Plantability Potential	Low	Low
Hydrologic Soil Group	C	D-C
Potential for Roadbed Damage	Moderate	Low
Inclusions (20%)	Lithic Haploxeralfs Weitchpec family Rock outcrop - ultramafic	
Remarks:	Ca/Mg imbalance will limit species and growth on ultramafic soils.	

46 Dubakella family-Rock outcrop complex, 20 to 40 percent slopes

Map Unit Components	Dubakella family (50%)	Rock outcrop (30%)
Geomorphic Position	Moderately steep mountain sideslopes.	Moderately steep mountain sideslopes.
Typical Vegetation Series	Jeffrey Pine - Incense Cedar Woodland	

Soil Profile Description

Surface Soil	0-11" reddish brown cobbly loam and very stony clay loam, weak and moderate very fine subangular blocky structure, 30 to 50% gravel, cobbles and stones, neutral.
Subsoil	11-18" strong brown extremely stony clay, strong fine subangular blocky structure, 65% gravels and stones, mildly alkaline.
Substratum	18-26" strong brown extremely stony clay, massive, 85% gravel and stones, mildly alkaline, 26-30" ultramafic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	5-6	
Adapted Species Group	JP, IC, DF	
Soil Erodibility	High	
AWC for Profile Depth	1.8-4.2	
AWC for Surface 24"	1.8-3.0	
Seedling Survival Potential	Low-Moderate	
Plantability Potential	Moderate-High	
Hydrologic Soil Group	C	D
Potential for Roadbed Damage	Moderate	Low
Inclusions (20%)	Weitchpec family Beaughton family	
Remarks:	Ca/Mg imbalance will limit species and growth on ultramafic soils.	

47 Dubakella-Weitchpec families complex, 20 to 40 percent slopes

Map Unit Components
 Geomorphic Position
 Typical Vegetation Series

Dubakella family (60%)
 Moderately steep, mountain sideslopes.
 Jeffrey Pine - Incense Cedar Woodland
 Serpentine Chaparral

Weitchpec family (30%)
 Moderately steep, mountain sideslopes.
 Jeffrey Pine - Incense Cedar Woodland
 Serpentine Chaparral

Soil Profile Description

Surface Soil

0-11" reddish brown cobbly loam and very stony clay loam, weak and moderate very fine subangular blocky structure, 30 to 50% gravel, cobbles and stones, neutral.

0-5" light gray gravelly loam, moderate fine and medium granular structure, 30% gravel, slightly acid.

Subsoil

11-18" strong brown extremely stony clay, strong fine subangular blocky structure, 65% gravels and stones, mildly alkaline.

5-25" white to pale yellow very gravelly loam, moderate fine subangular blocky structure, 35-45% gravel, slightly acid to neutral.

Substratum

18-26" strong brown extremely stony clay, massive, 85% gravel and stones, mildly alkaline,
 26-30" ultramafic rock.

25-38" highly fractured ultramafic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class

5-6

5-6

Adapted Species Group

JP, IC, DF

JP, IC, DF

Soil Erodibility

High

Moderate

AWC for Profile Depth

1.8-4.2

2.4-4.0

AWC for Surface 24"

1.8-3.0

2.0-2.7

Seedling Survival Potential

Low-Moderate

Low-Moderate

Plantability Potential

Moderate-High

Moderate-High

Hydrologic Soil Group

C

B

Potential for Roadbed Damage

Moderate

Moderate

Inclusions (10%)

Grell family
 Beaughton family

Remarks:

Ca/Mg imbalance will limit species and growth on ultramafic soils.

48 Dubakella-Weitchpec families complex, 40 to 60 percent slopes

Map Unit Components	Dubakella family (65%)	Weitchpec family (25%)
Geomorphic Position	Steep, broken mountain sideslopes.	Steep linear, mountain sideslopes.
Typical Vegetation Series	Jeffrey Pine - Incense Cedar Woodland Serpentine Chaparral	Jeffrey Pine - Incense Cedar Woodland Serpentine Chaparral

Soil Profile Description

Surface Soil	0-11" reddish brown cobbly loam and very stony clay loam, weak and moderate very fine subangular blocky structure, 30 to 50% gravel, cobbles and stones, neutral.	0-5" light gray gravelly loam, moderate fine and medium granular structure, 30% gravel, slightly acid.
Subsoil	11-18" strong brown extremely stony clay, strong fine subangular blocky structure, 65% gravels and stones, mildly alkaline.	5-25" white to pale yellow very gravelly loam, moderate fine subangular blocky structure, 35-45% gravel, slightly acid to neutral.
Substratum	18-26" strong brown extremely stony clay, massive, 85% gravel and stones, mildly alkaline, 26-30" ultramafic rock.	25-38" highly fractured ultramafic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	5-6	5-6
Adapted Species Group	JP, IC, DF	JP, IC, DF
Soil Erodibility	High	Moderate
AWC for Profile Depth	1.8-4.2	2.4-4.0
AWC for Surface 24"	1.8-3.0	2.0-2.7
Seedling Survival Potential	Low-Moderate	Low-Moderate
Plantability Potential	High-Moderate	High-Moderate
Hydrologic Soil Group	C	B
Potential for Roadbed Damage	Moderate	Moderate
Inclusions (10%)	Lithic Haploxerafs Beaughton family	
Remarks:	Ca/Mg imbalance will limit species and growth on ultramafic soils.	

49 Dubakella-Weitchpec families complex, 60 to 80 percent slopes

Map Unit Components	Dubakella family (55%)	Weitchpec family (30%)
Geomorphic Position	Very steep, linear to broken, lower mountain sideslopes.	Very steep linear, lower mountain sideslopes.
Typical Vegetation Series	Jeffrey Pine - Incense Cedar Woodland Serpentine Chaparral	Jeffrey Pine - Incense Cedar Woodland Serpentine Chaparral

Soil Profile Description

Surface Soil	0-11" reddish brown cobbly loam and very stony clay loam, weak and moderate very fine subangular blocky structure, 30 to 50% gravel, cobbles and stones, neutral.	0-5" light gray gravelly loam, moderate fine and medium granular structure, 30% gravel, slightly acid.
Subsoil	11-18" strong brown extremely stony clay, strong fine subangular blocky structure, 65% gravels and stones, mildly alkaline.	5-25" white to pale yellow very gravelly loam, moderate fine subangular blocky structure, 35-45% gravel, slightly acid to neutral.
Substratum	18-26" strong brown extremely stony clay, massive, 85% gravel and stones, mildly alkaline, 26-30" ultramafic rock.	25-38" highly fractured ultramafic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	5-6	5-6
Adapted Species Group	JP, IC, DF	JP, IC, DF
Soil Erodibility	High	Moderate
AWC for Profile Depth	1.8-4.2	2.4-4.0
AWC for Surface 24"	1.8-3.0	2.0-2.7
Seedling Survival Potential	Low-Moderate	Low-Moderate
Plantability Potential	Low	Low
Hydrologic Soil Group	C	B
Potential for Roadbed Damage	Moderate	Moderate

Inclusions (15%)
 Lithic Haploxeralfs
 Beaughton family
 Rock outcrop, ultramafic

Remarks: Ca/Mg imbalance will limit species and growth on ultramafic soils.

50 Dunsmuir family, 15 to 40 percent slopes

Map Unit Components	Dunsmuir family (75%)
Geomorphic Position	Gently sloping to moderately steep broken mountain sideslopes.
Typical Vegetation Series	Sierran-Cascade Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-7" reddish brown gravelly light sandy clay loam, moderate fine granular and weak medium subangular blocky structure, 20-35% gravel, medium acid.
Subsoil	7-53" reddish brown gravelly clay loam and gravelly clay to yellowish red very cobbly clay loam, moderate medium subangular blocky structure, 20-55% gravel and cobbles, medium acid.
Substratum	53-60" weathered ultramafic rock, paralithic contact.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-5
Adapted Species Group	DF, PP, SP, JP
Soil Erodibility	Moderate
AWC for Profile Depth	6.5-10.0
AWC for Surface 24"	3.3-3.8
Seedling Survival Potential	High
Plantability Potential	High-Moderate
Hydrologic Soil Group	B-C
Potential for Roadbed Damage	High
Inclusions (25%)	Holland family, deep Ishi Pishi family, deep Holland family
Remarks:	Moderate to low Ca/Mg imbalance in Dunsmuir and Ishi Pishi soil, may limit tree species.

51 Dunsmuir family, 40 to 55 percent slopes

Map Unit Components	Dunsmuir family (75%)
Geomorphic Position	Moderately steep broken mountain sideslopes.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest Sierran-Cascade Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-7" reddish brown gravelly light sandy clay loam, moderate fine granular and weak medium subangular blocky structure, 20-35% gravel, medium acid.
Subsoil	7-53" reddish brown gravelly clay loam and gravelly clay to yellowish red very cobbly clay loam, moderate medium subangular blocky structure, 20-55% gravel and cobbles, medium acid.
Substratum	53-60" weathered ultramafic rock, paralithic contact.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-5
Adapted Species Group	DF, PP, SP, JP
Soil Erodibility	Moderate
AWC for Profile Depth	6.5-10.0
AWC for Surface 24"	3.3-3.8
Seedling Survival Potential	High
Plantability Potential	High
Hydrologic Soil Group	B-C
Potential for Roadbed Damage	High
Inclusions (25%)	Ishi Pishi family, deep Holland family, deep Ishi Pishi family
Remarks:	Ca/Mg imbalance may limit tree species and growth on ultramafic soils.

52 Dunsmuir-Dubakella-Weitchpec families complex, 40 to 60 percent slopes

Map Unit Components	Dunsmuir family (40%)	Dubakella family (25%)	Weitchpec family (25%)
Geomorphic Position	Steep, broken mountain sideslopes.	Benches and steep mountain sideslopes.	Steep mountain sideslopes.
Typical Vegetation Series	Jeffrey Pine, Mixed Conifer Chaparral	Jeffrey Pine - Incense Cedar Incense Cedar, Woodland, Chaparral	Jeffrey Pine - Forest Incense Cedar, Woodland,

Soil Profile Description

Surface Soil	0-7" reddish brown gravelly light granular and weak structure, 20-35% gravel, medium acid.	0-11" reddish brown cobbly loam and very stony clay loam, weak and moderate very fine subangular blocky structure, 30 to 50% gravel, cobbles and stones, neutral.	0-5" light gray sandy clay loam, moderate fine gravelly loam, moderate fine and medium subangular blocky and medium granular structure, 30% gravel, slightly acid.
Subsoil	7-53" reddish brown gravelly clay yellowish red very cobbly clay loam, moderate medium subangular gravel and cobbles. Medium acid.	11-18" strong brown extremely stony clay, strong fine subangular blocky structure, 65% gravel and stones, mildly alkaline.	5-25" white to pale yellow loam and gravelly clay to very gravelly loam, moderate fine subangular blocky structure, 35-45% blocky structure, 20-55% gravel, slightly acid to neutral.
Substratum	53-60" weathered ultramafic rock, paralithic contact.	18-26" strong brown extremely stony clay, massive, 85% gravel and stones, mildly alkaline, 26-30" ultramafic rock.	25-38" highly fractured ultramafic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-5	5-6	5-6
Adapted Species Group	DF, PP, SP, JP	JP, IC, DF	JP, IC, DF
Soil Erodibility	Moderate	High	Moderate
AWC for Profile Depth	6.5-10.0	1.8-4.2	2.4-4.0
AWC for Surface 24"	3.3-3.8	1.8-3.0	2.0-2.7
Seedling Survival Potential	High Low-Moderate	Low-Moderate	
Plantability Potential	High	Moderate	Moderate
Hydrologic Soil Group	B-C	C	B
Potential for Roadbed Damage	High	Moderate	
Remarks:	Dubakella and Weitchpec limitations: Ca/Mg imbalance may limit species growth on ultramafic soils.		

53 Dunsmuir-Ishi Pishi, deep families, complex, 20 to 40 percent slopes

Map Unit Components	Dunsmuir family (55%)	Ishi Pishi family, deep (25%)
Geomorphic Position	Moderately steep, broken mountain sideslopes.	Gently sloping to moderately steep, broken mountain sideslopes.
Typical Vegetation Series	Sierran-Cascade Mixed Conifer Forest, Klamath Enriched Mixed Conifer Forest	Sierran-Cascade Mixed Conifer Forest, Klamath Enriched Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-7" reddish brown gravelly light sandy clay loam, moderate fine granular and weak medium subangular blocky structure, 20-35% gravel, medium acid.	0-3" brown heavy gravelly loam, weak fine granular structure, 30% gravel, neutral.
Subsoil	7-53" reddish brown gravelly clay loam and gravelly clay to yellowish red very cobbly clay loam, moderate medium subangular blocky structure, 20-55% gravel and cobbles, medium acid.	3-48" yellowish red very gravelly heavy clay loam to heavy yellowish brown very cobbly clay, moderate to strong fine subangular blocky structure, 35-55% gravel and cobbles, slightly acid to neutral.
Substratum	53-60" weathered ultramafic rock, paralithic contact.	48-52" fractured, moderately weathered ultramafic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-5	4-5
Adapted Species Group	DF, PP, SP, JP	JP, IC, DF, WWP
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	6.5-10.0	5.0-6.9
AWC for Surface 24"	3.3-3.8	2.0-3.1
Seedling Survival Potential	High	Moderate-High
Plantability Potential	High-Moderate	High-Moderate
Hydrologic Soil Group	B-C	C
Potential for Roadbed Damage	High	Moderate

Inclusions (20%) Holland family, deep
Ishi Pishi family

Remarks: Ishi Pishi limitations: Ca/Mg imbalance limit species.

54 Dunsmuir-Olete families complex, 20 to 40 percent slopes

Map Unit Components	Dunsmuir family (60%)	Olete family (30%)
Geomorphic Position	Moderately steep, mountain sideslopes.	Moderately steep mountain sideslopes.
Typical Vegetation Series	Klamath Enriched Mixed Conifer Forest	Klamath Enriched Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-7" reddish brown gravelly light sandy clay loam, moderate fine granular and weak medium subangular blocky structure, 20-35% gravel, medium acid.	0-6" pale brown gravelly loam, weak very fine granular structure, 30% gravel, slightly acid.
Subsoil	7-53" reddish brown gravelly clay loam and gravelly clay to yellowish red very cobbly clay loam, moderate medium subangular blocky structure, 20-55% gravel and cobbles, medium acid.	6-35" light yellowish brown very gravelly loam to brownish yellow very cobbly heavy loam, weak very fine to coarse subangular blocky structure, 35-55% gravel and cobbles, slightly acid to neutral.
Substratum	53-60" weathered ultramafic rock, paralithic contact.	35-38" fractured ultramafic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-5	5
Adapted Species Group	DF, PP, SP, JP	DF, PP, SP
Soil Erodibility	Moderate	Low
AWC for Profile Depth	6.5-10.0	2.5-4.0
AWC for Surface 24"	3.3-3.8	1.6-3.1
Seedling Survival Potential	High	Low-High
Plantability Potential	High	Moderate
Hydrologic Soil Group	B-C	B
Potential for Roadbed Damage	High	Moderate

Inclusions (10%) Ishi Pishi family, deep
Ishi Pishi family

Remarks: Ca/Mg imbalance may limit species and growth on ultramafic soils.

55 Dystric Xerorthents, 5 to 40 percent slopes

Map Unit Components	Dystric Xerorthents (90%)
Geomorphic Position	Barren ridge tops.
Typical Vegetation Series	Barren/Pussy Paws

Soil Profile Description

Surface Soil	0-4" light gray very gravelly loam, single grain to massive, 40% gravel, extremely acid.
Subsoil	
Substratum	4-52" pale brown gravelly and very gravelly loam, single grain to massive, 15-25% gravel, extremely acid. 52+" highly fractured moderately weathered sericite schist.

Soil Properties & Management Interpretations

Forest Survey Site Class	7
Adapted Species Group	GL
Soil Erodibility	Moderate
AWC for Profile Depth	3.0-7.3
AWC for Surface 24"	2.5-3.2
Seedling Survival Potential	V. Low-Low
Plantability Potential	Moderate-High
Hydrologic Soil Group	B
Potential for Roadbed Damage	V. High
Inclusions (10%)	Yollabolly family Tallac family

56 Endlich family, 20 to 60 percent slopes

Map Unit Components	Endlich family (75%)
Geomorphic Position	Moderately steep to steep, dissected, linear mountain sideslopes and ridge tops.
Typical Vegetation Series	Red Fir Forest, Red Fir Subalpine Woodland Mountain Hemlock Forest

Soil Profile Description

Surface Soil	0-5" dark yellowish brown very fine sandy loam and yellowish brown very gravelly sandy loam, moderate and weak very fine granular structure, 10-45% gravel and cobbles, strongly to medium acid.
Subsoil	5-16" yellowish brown very gravelly very fine sandy loam, weak very fine granular structure, 55% gravel and cobbles, medium acid.
Substratum	16-38" yellowish brown very gravelly sandy loam and very cobbly coarse sandy loam, weak medium subangular blocky structure and single grain, 40-50% gravel and cobbles, strongly acid. 38-47" moderately fractured gabbro.

Soil Properties & Management Interpretations

Forest Survey Site Class	5-6
Adapted Species Group	WF, RF, JP
Soil Erodibility	Low
AWC for Profile Depth	1.8-3.4
AWC for Surface 24"	1.5-2.0
Seedling Survival Potential	Low-Moderate
Plantability Potential	High-Moderate
Hydrologic Soil Group	B
Potential for Roadbed Damage	Moderate
Inclusions (25%)	Rubble land and rock outcrop, basic intrusive Typic Cryaquolls
Remarks:	Endlich limitations: Extreme cold and short growing season.

57 Endlich family-Rubble land complex, 15 to 40 percent slopes

Map Unit Components	Endlich family (45%)	Rubble land, ultramafic (30%)
Geomorphic Position	Dissected, moderately steep, cirque basins and ridge tops.	Similar position as Endlich family.
Typical Vegetation Series	Mixed Subalpine Coniferous Subalpine Woodland Mountain Hemlock Forest	

Soil Profile Description

Surface Soil	0-5" dark yellowish brown very fine sandy loam and yellowish brown very gravelly sandy loam, moderate and weak very fine granular structure, 10-45% gravel and cobbles, strongly to medium acid.
Subsoil	5-16" yellowish brown very gravelly very fine sandy loam, weak very fine granular structure, 55% gravel and cobbles, medium acid.
Substratum	16-38" yellowish brown very gravelly sandy loam and very cobbly coarse sandy loam, weak medium subangular blocky structure and single grain, 40-50% gravel and cobbles, strongly acid. 38-47" moderately fractured gabbro.

Soil Properties & Management Interpretations

Forest Survey Site Class	5-6	
Adapted Species Group	WF, RF, JP	
Soil Erodibility	Low	
AWC for Profile Depth	1.8-3.4	
AWC for Surface 24"	1.5-2.0	
Seedling Survival Potential	Low-Moderate	
Plantability Potential	Low-V. Low	
Hydrologic Soil Group	B	D
Potential for Roadbed Damage	Moderate	Low
Inclusions (25%)	Deadfall family Lithic Cryochrepts Typic Cryaquolls	
Remarks:	Endlich limitations: Extreme cold and short growing season.	

58 Endlich family-Rubble land association, 50 to 70 percent slopes

Map Unit Components	Endlich family (55%)	Rubble land (20%)
Geomorphic Position	Steep to very steep, dissected, linear, ridge tops.	Steep to very steep, dissected, linear, ridges and upper mountain sideslopes.
Typical Vegetation Series	Mt. Hemlock Forest Mixed Subalpine Coniferous Forest, Lodgepole Pine Forest	

Soil Profile Description

Surface Soil	0-5" dark yellowish brown very fine sandy loam and yellowish brown very gravelly sandy loam, moderate and weak very fine granular structure, 10-45% gravel and cobbles, strongly to medium acid.
Subsoil	5-16" yellowish brown very gravelly very fine sandy loam, weak very fine granular structure, 55% gravel and cobbles, medium acid.
Substratum	16-38" yellowish brown very gravelly sandy loam and very cobbly coarse sandy loam, weak medium subangular blocky structure and single grain, 40-50% gravel and cobbles, strongly acid. 38-47" moderately fractured gabbro.

Soil Properties & Management Interpretations

Forest Survey Site Class	5-6	
Adapted Species Group	WF, RF, JP	
Soil Erodibility	Low	
AWC for Profile Depth	1.8-3.4	
AWC for Surface 24"	1.5-2.0	
Seedling Survival Potential	Low-Moderate	
Plantability Potential	Low-V. Low	
Hydrologic Soil Group	B	D
Potential for Roadbed Damage	Moderate	Low
Inclusions (25%)	Skymor family Entic Cryumbrepts Rock outcrop, basic intrusive Wapal family	
Remarks:	Endlich limitations: Extreme cold and short growing season.	

59 Endlich family-Typic Cryaquolls association, 5 to 40 percent slopes

Map Unit Components

Endlich family (50%)

Typic Cryaquolls (25%)

Geomorphic Position

Dissected, gentle to moderately steep, cirque basins and ground moraines.

Similar to the topography above.

Typical Vegetation Series

Mixed Upper Montane Coniferous Forest, Jeffrey Pine Mixed Conifer Forest, Western White Pine Subalpine Woodland

Subalpine West Meadows and Seeps

Soil Profile Description

Surface Soil

0-5" dark yellowish brown very fine sandy loam and yellowish brown very gravelly sandy loam, moderate and weak very fine granular structure, 10-45% gravel and cobbles, strongly to medium acid.

0-7" black sandy loam dark grayish brown silt loam, strong coarse granular moderate, fine and medium subangular blocky structure to massive, 0-10% gravel, neutral to strongly acid.

Subsoil

5-16" yellowish brown very gravelly very fine sandy loam, weak very fine granular structure, 55% gravel and cobbles, medium acid.

7-9" grayish brown gravelly light clay loam, massive 15% gravel and cobbles, strongly acid.

Substratum

16-38" yellowish brown very gravelly sandy loam and very cobbly coarse sandy loam, weak medium subangular blocky structure and single grain, 40-50% gravel and cobbles, strongly acid.
38-47" moderately fractured gabbro.

9-17" yellowish brown very cobbly sandy clay loam to brown extremely cobbly loamy sand, moderate coarse subangular blocky structure to single grain, 50-75% gravel and cobbles, slightly to strongly acid, water table.
17+" consolidated glacial till.

Soil Properties & Management Interpretations

Forest Survey Site Class

5-6

7

Adapted Species Group

WF, RF, JP

GL

Soil Erodibility

Low

Low

AWC for Profile Depth

1.8-3.4

*SAT

AWC for Surface 24"

1.5-2.0

SAT

Seedling Survival Potential

Low

SAT

Plantability Potential

V. Low

SAT

Hydrologic Soil Group

B

D

Potential for Roadbed Damage

Moderate

High

Inclusions (25%)

Deadfall family, Lithic Cryochrepts, Rubble land, ultramafic, Tallac family, Merkel family

Remarks:

Endlich limitations: Ca/Mg imbalance limits species and productivity. Typic Cryaquolls: Extreme cold and excess water.

60 Entic Cryumbrepts, 40 to 60 percent slopes

Map Unit Components	Entic Cryumbrepts (80%)
Geomorphic Position	Steep, dissected, linear, upper mountain slopes.
Typical Vegetation Series	Red Fir Forest

Soil Profile Description

Surface Soil	0-17" dark yellowish brown gravelly very fine sandy loam, weak very fine granular and subangular blocky structure, 15-20% gravel, slightly acid.
Subsoil	17-25" yellowish brown gravelly very fine sandy loam, weak coarse subangular blocky structure, 25% gravel, strongly acid.
Substratum	25-28" fractured basic metametasedimentary rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	5-7
Adapted Species Group	WF, RF, JP, BL
Soil Erodibility	Low
AWC for Profile Depth	3.7-6.0
AWC for Surface 24"	3.2-3.6
Seedling Survival Potential	High
Plantability Potential	High-Moderate
Hydrologic Soil Group	B
Potential for Roadbed Damage	Moderate
Inclusions (20%)	Endlich family
Remarks:	Entic Cryumbrepts limitations: unknown nutrient and moisture relationship limits growth, in some areas, may have high moisture status, extreme cold and short growing season.

61 Etsel family, 40 to 80 percent slopes

Map Unit Components	Etsel family (75%)
Geomorphic Position	Steep to very steep, dissected linear, mountain sideslopes.
Typical Vegetation Series	Low Montane & Foothill Mixed Chaparral, Chamise Chaparral, Very open Digger Pine Woodland

Soil Profile Description

Surface Soil	0-9" brown very gravelly loam, weak very fine and fine granular structure, 40-45% gravel and cobbles, slightly to medium acid.
Subsoil	
Substratum	9-12" fractured shale.

Soil Properties & Management Interpretations

Forest Survey Site Class	7
Adapted Species Group	BL, GL
Soil Erodibility	Moderate
AWC for Profile Depth	0.7-1.2
AWC for Surface 24"	0.7-1.2
Seedling Survival Potential	V. Low-Low
Plantability Potential	V. Low
Hydrologic Soil Group	D
Potential for Roadbed Damage	Low
Inclusions (25%)	Rock outcrop, metamorphic Goulding family Rubble land Deadwood family
Remarks:	In some areas, may have high moisture status, extreme cold and short growing season.

62 Etsel-Neuns families association, 60 to 80 percent slopes

Map Unit Components

Etsel family (50%)

Neuns family (25%)

Geomorphic Position

Very steep dissected mountain sideslopes.

Cooler aspects and colluvial pockets and dissected mountain sideslopes.

Typical Vegetation Series

Low Montane & Foothill Mixed Chaparral, Chamise Chaparral

Douglas-fir-Pine Mixed Conifer Forest

Soil Profile Description

Surface Soil

0-9" brown very gravelly loam, weak very fine and fine granular structure, 40-45% gravel and cobbles, slightly to medium acid.

0-11" brown to light brown very gravelly sandy loam, weak to moderate medium granular structure, 35-45% gravel, slightly acid.

Subsoil

11-23" light brown very gravelly sandy loam, moderate fine subangular blocky structure, 55% gravel and cobbles, slightly acid.

Substratum

9-12" fractured shale.

23'34" highly fractured, slightly weathered metamorphic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class

7

5

Adapted Species Group

BL, GL

DF, PP, SP

Soil Erodibility

Moderate

Low

AWC for Profile Depth

0.7-1.2

2.3-4.8

AWC for Surface 24"

0.7-1.2

1.6-3.2

Seedling Survival Potential

V. Low-Low

Low-High

Plantability Potential

V. Low

Low

Hydrologic Soil Group

D

B

Potential for Roadbed Damage

Low

Moderate

Inclusions (25%)

Goulding family, Rock outcrop, metamorphic, Rubble land, Hugo family, moderately deep

Remarks:

63 Etsel-Rock outcrop complex, 50 to 80 percent slopes

Map Unit Components	Etsel family (60%)	Rock outcrop (30%)
Geomorphic Position	Steep to very steep highly dissected, linear, mountain sideslopes.	Position similar to Etsel family.
Typical Vegetation Series	Low Montane & Foothill Mixed Chaparral, Chamise Chaparral	

Soil Profile Description

Surface Soil	0-9" brown very gravelly loam, weak very fine and fine granular structure, 40-45% gravel and cobbles, slightly to medium acid.
Subsoil	
Substratum	9-12" Fractured shale.

Soil Properties & Management Interpretations

Forest Survey Site Class	7	
Adapted Species Group	BL, GL	
Soil Erodibility	Moderate	
AWC for Profile Depth	0.7-1.2	
AWC for Surface 24"	0.7-1.2	
Seedling Survival Potential	V. Low-Low	
Plantability Potential	V. Low	
Hydrologic Soil Group	D	D
Potential for Roadbed Damage	Low	Low
Inclusions (10%)	Goulding family, Rubble land	
Remarks:		

64 Fons family, 25 to 40 percent slopes

Map Unit Components	Fons family (80%)
Geomorphic Position	Mid to lower slopes of cinder cones.
Typical Vegetation Series	White Fir Forest Scree/Conifer Bitterbrush Goldenbush Scrub

Soil Profile Description

Surface Soil	0-3" dark grayish sandy loam, single grain, 10% gravel, medium acid.
Subsoil	3-21" brown loam, strong, coarse and medium subangular blocky structure, 20-30% gravel and cinders, slightly acid.
Substratum	21-53" brown very cindery fine sandy loam, weak medium subangular blocky structure, 60-80% cinders, gravel and cobbles, neutral.

Soil Properties & Management Interpretations

Forest Survey Site Class	5
Adapted Species Group	DF, PP, SP, WF
Soil Erodibility	Moderate
AWC for Profile Depth	2.1-3.1
AWC for Surface 24"	1.1-1.9
Seedling Survival Potential	Low
Plantability Potential	Moderate-High
Hydrologic Soil Group	A
Potential for Roadbed Damage	Moderate
Inclusions (20%)	Rock outcrop, volcanic Cinder talus
Remarks:	Commonly commercially mined for cinders.

65 Forbes family, 0 to 20 percent slopes

Map Unit Components	Forbes family (75%)
Geomorphic Position	Elevated terraces.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-8" reddish brown and yellowish red loam, strong fine granular and weak fine subangular blocky structure, 5-10% gravel, slightly acid.
Subsoil	8-67" yellowish red clay to yellowish red gravelly sandy clay loam, weak coarse subangular blocky structure to massive, 13-30% gravel and cobbles, strongly acid.
Substratum	

Soil Properties & Management Interpretations

Forest Survey Site Class	3-4
Adapted Species Group	DF, PP, SP
Soil Erodibility	Moderate
AWC for Profile Depth	7.4-9.0
AWC for Surface 24"	3.0-3.6
Seedling Survival Potential	High
Plantability Potential	High
Hydrologic Soil Group	B
Potential for Roadbed Damage	High
Inclusions (25%)	Holland family, deep Soulajule family
Remarks:	

66 Forbes family, 20 to 40 percent slopes

Map Unit Components	Forbes family (75%)
Geomorphic Position	Gentle sloping terraces.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-8" reddish brown and yellowish red loam, strong fine granular and weak fine subangular blocky structure, 5-10% gravel, slightly acid.
Subsoil	8-67" yellowish red clay to yellowish red gravelly sandy clay loam, weak coarse subangular blocky structure to massive, 13-30% gravel and cobbles, strongly acid.
Substratum	

Soil Properties & Management Interpretations

Forest Survey Site Class	3-4
Adapted Species Group	DF, PP, SP
Soil Erodibility	Moderate
AWC for Profile Depth	7.4-9.0
AWC for Surface 24"	3.0-3.6
Seedling Survival Potential	High
Plantability Potential	High
Hydrologic Soil Group	B
Potential for Roadbed Damage	High
Inclusions (25%)	Holland family, deep Soulajule family Marpa family
Remarks:	

67 Forbes family, 40 to 60 percent slopes

Map Unit Components	Forbes family (75%)
Geomorphic Position	Steep dissected ridgetops, broken mountain sideslopes and terraces.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-8" reddish brown and yellowish red loam, strong fine granular and weak fine subangular blocky structure, 5-10% gravel, slightly acid.
Subsoil	8-67" yellowish red clay to yellowish red gravelly sandy clay loam, weak coarse subangular blocky structure to massive, 13-30% gravel and cobbles, strongly acid.
Substratum	

Soil Properties & Management Interpretations

Forest Survey Site Class	3-4
Adapted Species Group	DF, PP, SP
Soil Erodibility	Moderate
AWC for Profile Depth	7.4-9.0
AWC for Surface 24"	3.0-3.6
Seedling Survival Potential	High
Plantability Potential	High
Hydrologic Soil Group	B
Potential for Roadbed Damage	High
Inclusions (25%)	Marpa family Soulajule family
Remarks:	

68 Forbes-Soulajule families complex, 30 to 60 percent slopes

Map Unit Components	Forbes family (60%)	Soulajule family (30%)
Geomorphic Position	Dissected terraces, steep mountain sideslopes.	Elevated terraces, steep mountain sideslopes.
Typical Vegetation Series	Douglas-Fir-Pine, Mixed Conifer Forest	Gary Oak Woodland, Digger Pine Woodland

Soil Profile Description

Surface Soil	0-8" reddish brown and yellowish red loam, strong fine granular and weak fine subangular blocky structure, 5-10% gravel, slightly acid.	0-8" strong brown loam and gravelly loam, strong fine granular and subangular, blocky structure, 10-20% gravel, neutral.
Subsoil	8-67" yellowish red clay to yellowish red gravelly sandy clay loam, weak coarse subangular blocky structure to massive, 13-30% gravel and cobbles, strongly acid.	8-31" yellowish red and strong brown very gravelly clay loam to yellowish red very cobbly clay, moderate medium subangular blocky structure 18-40% gravel and cobbles, slightly acid.
Substratum		31-40" consolidated nonmarine sediment (paralithic contact).

Soil Properties & Management Interpretations

Forest Survey Site Class	3-4	6
Adapted Species Group	DF, PP, SP	BL, DF, JP, SP
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	7.4-9.0	2.5-4.5
AWC for Surface 24"	3.0-3.6	2.1-3.3
Seedling Survival Potential	High	Low
Plantability Potential	High	Moderate
Hydrologic Soil Group	B	C
Potential for Roadbed Damage	High	High
Inclusions (10%)	Marpa family	
Remarks:		

69 Germany family, 0 to 25 percent slopes

Map Unit Components	Germany family (80%)
Geomorphic Position	Ash Deposition level lava flows.
Typical Vegetation Series	Bitterbrush - Goldenbush Scrub, Ponderosa Pine Forest

Soil Profile Description

Surface Soil	0-18" dark grayish brown and dark brown gravelly sandy loam, weak fine and medium granular structure, 15% gravel, slightly acid.
Subsoil	18-28" brown very gravelly sandy loam, weak medium and coarse subangular blocky structure, 35% gravel, slightly acid.
Substratum	28-32" brown very gravelly sandy loam, relict rock structure, 60% gravel, slightly acid. 32-34" unweathered basalt.

Soil Properties & Management Interpretations

Forest Survey Site Class	5
Adapted Species Group	PP
Soil Erodibility	Low
AWC for Profile Depth	2.2-3.2
AWC for Surface 24"	2.5-3.4
Seedling Survival Potential	Moderate-High
Plantability Potential	High
Hydrologic Soil Group	B
Potential for Roadbed Damage	High
Inclusions (20%)	Germany family, deep Ledmount family
Remarks:	Germany family, moderately deep is mapped as Nikal series on adjacent soil-veg. survey.

70 Germany family-Germany family, deep complex, 0 to 20 percent slopes

Map Unit Components	Germany family (60%)	Germany family, deep (30%)
Geomorphic Position	Ash deposits on level to gently sloping uplands and lava flows.	Level terraces.
Typical Vegetation Series	Ponderosa Pine Forest, Upper Montane Mixed Chaparral	Ponderosa Pine Forest, Upper Montane Mixed Chaparral

Soil Profile Description

Surface Soil	0-18" dark grayish brown and dark brown gravelly sandy loam, weak fine and medium granular structure, 15% gravel, slightly acid.	0-6" very dark brown sandy loam weak medium subangular blocky structure 5% gravel, slightly acid.
Subsoil	18-28" brown very gravelly sandy loam, weak medium and coarse subangular blocky structure, 35% gravel, slightly acid.	6-31" dark brown fine sandy loam, and yellowish brown gravelly fine sandy loam, weak medium and fine subangular blocky structure, 10-15% gravel, slightly acid.
Substratum	28-32" brown very gravelly sandy loam, relict rock structure, 60% gravel, slightly acid. 32-34" unweathered basalt.	31-60" light yellowish brown gravelly sandy loam and brown very gravelly very fine sandy loam, massive, 30-40% gravel, neutral.

Soil Properties & Management Interpretations

Forest Survey Site Class	5	3
Adapted Species Group	PP	PP, WF, JP, SP
Soil Erodibility	Low	Moderate
AWC for Profile Depth	2.2-3.2	5.0-6.3
AWC for Surface 24"	2.5-3.4	2.7-3.6
Seedling Survival Potential	Moderate-High	High
Plantability Potential	High	High
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	High	High
Inclusions (10%)	Ledmount family	
Remarks:	Germany family, moderately deep is mapped as Nikal series on adjacent soil-veg. survey.	

71 Germany Ledmount families complex, 0 to 10 percent slopes

Map Unit Components	Germany family (60%)	Ledmount family (30%)
Geomorphic Position	Ash deposits on level to lava flows.	Level lava flows.
Typical Vegetation Series	Bitterbrush - Goldenbush Scrub, Ponderosa Pine Forest	Bitterbrush - Goldenbush Scrub, Ponderosa Pine Forest

Soil Profile Description

Surface Soil	0-18" dark grayish brown and dark brown gravelly sandy loam, weak fine and medium granular structure, 15% gravel, slightly acid.	0-9" dark brown fine sandy loam to brown cobbly sandy loam, single grain to weak medium and coarse subangular blocky structure, 15-25% gravel and cobbles, slightly to medium acid.
Subsoil	18-28" brown very gravelly sandy loam, weak medium and coarse subangular blocky structure, 35% gravel, slightly acid.	9-13" yellowish brown cobbly sandy loam, weak medium and coarse subangular blocky structure, 25% cobbles and gravel, medium acid.
Substratum	28-32" brown very gravelly sandy loam, relict rock structure, 60% gravel, slightly acid. 32-34" unweathered basalt.	13-14" fractured basalt bedrock.

Soil Properties & Management Interpretations

Forest Survey Site Class	5	7
Adapted Species Group	PP	BL
Soil Erodibility	Low	Moderate
AWC for Profile Depth	2.2-3.2	0.9-1.1
AWC for Surface 24"	2.5-3.4	0.9-1.1
Seedling Survival Potential	Moderate-High	Low-Low
Plantability Potential	High	V. Low-Low
Hydrologic Soil Group	B	D
Potential for Roadbed Damage	High	Low

Inclusions (10%) Rock outcrop, volcanic
Germany family, deep

Remarks: Germany family, moderately deep is mapped as Nikal series on adjacent soil-veg. survey.

72 Germany-Shasta families association, 0 to 20 percent slopes

Map Unit Components	Germany family (60%)	Shasta family (30%)
Geomorphic Position	Ash deposits on gently sloping lava flows.	Outwash terraces between lava flows.
Typical Vegetation Series	Upper Montane Mixed Chaparral, Bitterbrush - Goldenbush Scrub	Ponderosa Pine Forest, Upper Montane Mixed Chaparral

Soil Profile Description

Surface Soil	0-18" dark grayish brown and dark brown gravelly sandy loam, weak fine and medium granular structure, 15% gravel, slightly acid.	0-22" very dark grayish brown coarse sandy loam to dark grayish brown loamy sand, moderate very fine granular structure, 7-11% gravel, strongly acid.
Subsoil	18-28" brown very gravelly sandy loam, weak medium and coarse subangular blocky structure, 35% gravel, slightly acid.	
Substratum	28-32" brown very gravelly sandy loam, relict rock structure, 60% gravel, slightly acid. 32-34" unweathered basalt.	22-70" grayish brown cobbly loamy sand to gray very cobbly coarse sand, very weak medium subangular blocky structure to massive, 29-35% gravel and cobbles, medium to strongly acid.

Soil Properties & Management Interpretations

Forest Survey Site Class	5	3
Adapted Species Group	PP	PP
Soil Erodibility	Low	Moderate
AWC for Profile Depth	2.2-3.2	3.6-4.9
AWC for Surface 24"	2.5-3.4	1.3-2.2
Seedling Survival Potential	Moderate-High	High
Plantability Potential	High	High
Hydrologic Soil Group	B	A
Potential for Roadbed Damage	High	High
Inclusions (10%)	Rock outcrop, volcanic Germany family, deep Ledmount family	
Remarks:	Germany family, moderately deep is mapped as Nikal series on adjacent soil-veg. survey, it occurs in this unit on slightly elevated areas with Shasta family in low areas.	

73 Germany-Washougal families association, 0 to 20 percent slopes

Map Unit Components	Germany family (60%)	Washougal family (30%)
Geomorphic Position	Ash deposits on level lava flows.	Gently sloping lava flows, dissected lava flows.
Typical Vegetation Series	Bitterbrush - Goldenbush Scrub Ponderosa Pine Forest	White Fir Forest, Ponderosa Pine Forest, Bitterbrush - Goldenbush Scrub

Soil Profile Description

Surface Soil	0-18" dark grayish brown and dark brown gravelly sandy loam, weak fine and medium granular structure, 15% gravel, slightly acid.	0-10" dark brown gravelly loam and very cobbly fine sandy loam, weak fine subangular blocky structure, 15 to 65% cobbles and gravel, neutral to slightly acid.
Subsoil	18-28" brown very gravelly sandy loam, weak medium and coarse subangular blocky structure, 35% gravel, slightly acid.	10-30" brown extremely cobbly fine sandy loam, weak very fine subangular blocky structure, 70% cobbles and gravel, neutral.
Substratum	28-32" brown very gravelly sandy loam, relict rock structure, 60% gravel, slightly acid. 32-34" unweathered basalt.	30-32" fractured basalt.

Soil Properties & Management Interpretations

Forest Survey Site Class	5	5
Adapted Species Group	PP	PP
Soil Erodibility	Low	Moderate
AWC for Profile Depth	2.2-3.2	1.6-3.4
AWC for Surface 24"	2.5-3.4	1.4-2.3
Seedling Survival Potential	Moderate-High	
Plantability Potential	High	
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	High	Low

Inclusions (10%)
Ledmount family
Germany family, deep

Remarks:
Germany family moderately deep is mapped as Nikal series on adjacent soil-veg. survey.
Plantability of Washougal family, moderately deep is dependent on depth of ashy overburden, it is mapped as McCarthy series on adjacent soil-veg. survey.

74 Germany family, deep, 0 to 20 percent slopes

Map Unit Components	Germany family, deep (80%)
Geomorphic Position	Ash deposits on gently sloping lava flows and terraces.
Typical Vegetation Series	White Fir Forest Ponderosa Pine Forest, Bitterbrush - Goldenbush Scrub

Soil Profile Description

Surface Soil	0-6" very dark brown sandy loam weak medium subangular blocky structure 5% gravel, slightly acid.
Subsoil	6-31" dark brown fine sandy loam, and yellowish brown gravelly fine sandy loam, weak medium and fine subangular blocky structure, 10-15% gravel, slightly acid.
Substratum	31-60" light yellowish brown gravelly sandy loam and brown very gravelly very fine sandy loam, massive, 30-40% gravel, neutral.

Soil Properties & Management Interpretations

Forest Survey Site Class	3
Adapted Species Group	PP, WF, JP, SP
Soil Erodibility	Moderate
AWC for Profile Depth	5.0-6.3
AWC for Surface 24"	2.7-3.6
Seedling Survival Potential	High
Plantability Potential	High
Hydrologic Soil Group	B
Potential for Roadbed Damage	High
Inclusions (20%)	Germany family
Remarks:	Mapped in residual, colluvial and alluvial settings.

75 Germany deep-Neer families association, 0 to 20 percent slopes

Map Unit Components	Germany family, deep (60%)	Neer family (30%)
Geomorphic Position	Ash deposits on gently sloping lava flows.	Ash deposits on moderately steep sideslopes.
Typical Vegetation Series	White Fir Forest Ponderosa Pine Forest, Sierrain-Cascade Mixed Conifer Forest	White Fir Forest Ponderosa Pine Forest, Sierrain-Cascade Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-6" very dark brown sandy loam weak medium subangular blocky structure 5% gravel, slightly acid.	0-9" dark brown to yellowish brown gravelly sandy loam, moderate fine granular to weak medium subangular blocky structure, 30% gravel, medium acid.
Subsoil	6-31" dark brown fine sandy loam, and yellowish brown gravelly fine sandy loam, weak medium and fine subangular blocky structure, 10-15% gravel, slightly acid.	9-26" light yellowish brown gravelly and very gravelly sandy loam, weak medium subangular blocky structure, 35-40% gravel, medium acid.
Substratum	31-60" light yellowish brown gravelly sandy loam and brown very gravelly very fine sandy loam, massive, 30-40% gravel, neutral.	26-35" extrusive igneous rock, paralithic contact.

Soil Properties & Management Interpretations

Forest Survey Site Class	3	5
Adapted Species Group	PP, WF, JP, SP	PP
Soil Erodibility	Moderate	Low
AWC for Profile Depth	5.0-6.3	1.6-3.6
AWC for Surface 24"	2.7-3.6	1.4-2.1
Seedling Survival Potential	High	Low-Moderate
Plantability Potential	High	V. Low-Moderate
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	High	Low

Inclusions (10%)
 Germany family
 Ledmount family

Remarks: Neer family includes gravelly and cobbly phases; cobbly phase has poor plantability.

76 Germany family, deep-Rock outcrop association, 0 to 20 percent slopes

Map Unit Components	Germany family, deep (60%)	Rock outcrop (30%)
Geomorphic Position	Ash deposits on gently sloping sideslopes and older lava flows.	Recent lava ridges and flows.
Typical Vegetation Series	White Fir Forest Ponderosa Pine Forest, Upper Montane Mixed Chaparral	Mt. Mahogany Black Oak Forest

Soil Profile Description

Surface Soil	0-6" very dark brown sandy loam weak medium subangular blocky structure 5% gravel, slightly acid.
Subsoil	6-31" dark brown fine sandy loam, and yellowish brown gravelly fine sandy loam, weak medium and fine subangular blocky structure, 10-15% gravel, slightly acid.
Substratum	31-60" light yellowish brown gravelly sandy loam and brown very gravelly very fine sandy loam, massive, 30-40% gravel, neutral.

Soil Properties & Management Interpretations

Forest Survey Site Class	3	
Adapted Species Group	PP, WF, JP, SP	
Soil Erodibility	Moderate	
AWC for Profile Depth	5.0-6.3	
AWC for Surface 24"	2.7-3.6	
Seedling Survival Potential	High	
Plantability Potential	High	
Hydrologic Soil Group	B	D
Potential for Roadbed Damage	High	Low
Inclusions (10%)	Germany family Neer family Ledmount	
Remarks:	Rock outcrop is more recent flow on older soils surface.	

77 Germany, deep-Washougal families complex, 0 to 20 percent slopes

Map Unit Components	Germany family, deep (60%)	Washougal family (30%)
Geomorphic Position	Ash deposits on top of recent lava flows.	Broad ridges, lava flows.
Typical Vegetation Series	White Fir Forest Ponderosa Pine Forest, Upper Montane Mixed Chaparral	White Fir Forest Ponderosa Pine Forest, Upper Montane Mixed Conifer

Soil Profile Description

Surface Soil	0-6" very dark brown sandy loam weak medium subangular blocky structure 5% gravel, slightly acid.	0-10" dark brown gravelly loam and very cobbly fine sandy loam, weak fine subangular blocky structure, 15 to 65% cobbles and gravel, neutral to slightly acid.
Subsoil	6-31" dark brown fine sandy loam, and yellowish brown gravelly fine sandy loam, weak medium and fine subangular blocky structure, 10-15% gravel, slightly acid.	10-30" brown extremely cobbly fine sandy loam, weak very fine subangular blocky structure, 70% cobbles and gravel, neutral.
Substratum	31-60" light yellowish brown gravelly sandy loam and brown very gravelly very fine sandy loam, massive, 30-40% gravel, neutral.	30-32" fractured basalt.

Soil Properties & Management Interpretations

Forest Survey Site Class	3	5
Adapted Species Group	PP, WF, JP, SP	PP
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	5.0-6.3	1.6-3.4
AWC for Surface 24"	2.7-3.6	1.4-2.3
Seedling Survival Potential	High	Low-Moderate
Plantability Potential	High	V. Low-Moderate
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	High	Low
Inclusions (10%)	Germany family	
Remarks:		

78 Glaciers

Map Unit Components

Glaciers (100%)

Geomorphic Position

Gentle to moderately steep ice mass.

Typical Vegetation Series

General Map Unit Description

Glaciers are a lenticular sheet of ice, formed by the compacting and recrystallization of great thickness of snow. They are located near the top of Mt. Shasta. Whitney, Bolam, Hotlum, Wintun and Knowakiton glaciers along with smaller bodies of ice comprise this unit.

Soil Properties & Management Interpretations

Forest Survey Site Class

Adapted Species Group

Soil Erodibility

AWC for Profile Depth

AWC for Surface 24"

Seedling Survival Potential

Plantability Potential

Hydrologic Soil Group

D

Potential for Roadbed
Damage

Low

79 Goulding family, 20 to 40 percent slopes

Map Unit Components	Goulding family (75%)
Geomorphic Position	Moderately steep, dissected mountain sideslopes.
Typical Vegetation Series	Canyon Oak Woodland Low Mountain & Foothill Mixed Chaparral

Soil Profile Description

Surface Soil	0-7" yellowish brown very gravelly loam, moderate medium subangular blocky structure, 40% gravel and cobbles, neutral.
Subsoil	7-15" yellowish brown very gravelly loam, moderate medium subangular blocky structure, 55% gravel and cobbles, neutral.
Substratum	15-20" fractured metavolcanic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	7
Adapted Species Group	BL
Soil Erodibility	Moderate
AWC for Profile Depth	0.7-1.9
AWC for Surface 24"	0.7-1.9
Seedling Survival Potential	V. Low-Low
Plantability Potential	V. Low-Low
Hydrologic Soil Group	D
Potential for Roadbed Damage	Low
Inclusions (25%)	Neuns family Etsel family Rock outcrop, metamorphic

Remarks:

80 Goulding family, 40 to 60 percent slopes

Map Unit Components	Goulding family (75%)
Geomorphic Position	Steep, dissected mountain sideslopes.
Typical Vegetation Series	Canyon Oak Woodland Low Mountain & Foothill Mixed Chaparral

Soil Profile Description

Surface Soil	0-7" yellowish brown very gravelly loam, moderate medium subangular blocky structure, 40% gravel and cobbles, neutral.
Subsoil	7-15" yellowish brown very gravelly loam, moderate medium subangular blocky structure, 55% gravel and cobbles, neutral.
Substratum	15-20" fractured metavolcanic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	7
Adapted Species Group	BL
Soil Erodibility	Moderate
AWC for Profile Depth	0.7-1.9
AWC for Surface 24"	0.7-1.9
Seedling Survival Potential	V. Low-Low
Plantability Potential	V. Low-Low
Hydrologic Soil Group	D
Potential for Roadbed Damage	Low
Inclusions (25%)	Typic Xerorthents Etsel family Rock outcrop, metamorphic Chawanakee family

Remarks:

81 Goulding family, 60 to 80 percent slopes

Map Unit Components	Goulding family (75%)
Geomorphic Position	Very steep, dissected mountain sideslopes.
Typical Vegetation Series	Canyon Oak Woodland Low Mountain & Foothill Mixed Chaparral

Soil Profile Description

Surface Soil	0-7" yellowish brown very gravelly loam, moderate medium subangular blocky structure, 40% gravel and cobbles, neutral.
Subsoil	7-15" yellowish brown very gravelly loam, moderate medium subangular blocky structure, 55% gravel and cobbles, neutral.
Substratum	15-20" fractured metavolcanic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	7
Adapted Species Group	BL
Soil Erodibility	Moderate
AWC for Profile Depth	0.7-1.9
AWC for Surface 24"	0.7-1.9
Seedling Survival Potential	V. Low-Low
Plantability Potential	Low
Hydrologic Soil Group	D
Potential for Roadbed Damage	Low
Inclusions (25%)	Etsel family Rock outcrop, metamorphic Rubble land Typic Xerorthents Deadwood family

Remarks:

82 Goulding-Holland families association, 40 to 60 percent slopes

	Goulding family (50%)	Holland family (20%)
Map Unit Components		
Geomorphic Position	Steep, dissected mountain sideslopes.	Steep mountain, sideslopes, toe slopes, benches.
Typical Vegetation Series	Canyon Oak Woodland Low Montane & Foothill Mixed Chaparral	Douglas-fir-Pine Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-7" yellowish brown very gravelly loam, moderate medium subangular blocky structure, 40% gravel and cobbles, neutral.	0-3" brown gravelly loam, strong fine granular structure, 30% gravel, slightly acid.
Subsoil	7-15" yellowish brown very gravelly loam, moderate medium subangular blocky structure, 55% gravel and cobbles, neutral.	3-18" light brown gravelly loam and gravelly clay loam, weak fine and moderate medium subangular blocky structure, 20 to 30% gravel, slightly to medium acid. 18-26" reddish yellow extremely gravelly sandy clay loam, moderate very fine subangular blocky structure, 70% gravel and cobbles, medium acid.
Substratum	15-20" fractured metavolcanic rock.	26-30" highly fractured, moderately weathered metavolcanic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	7	4-5
Adapted Species Group	BL	DF, PP, SP
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	0.7-1.9	3.0-4.4
AWC for Surface 24"	0.7-1.9	2.7-4.1
Seedling Survival Potential	V. Low-Low	Moderate-High
Plantability Potential	V. Low-Low	High
Hydrologic Soil Group	D	B
Potential for Roadbed Damage	Low	High
Inclusions (20%)	Marpa family Rock outcrop, metamorphic Neuns family	

Remarks:

83 Goulding-Marpa families association, 40 to 60 percent slopes

Map Unit Components	Goulding family (50%)	Marpa family (30%)
Geomorphic Position	Steep, dissected mountain sideslopes.	Steep mountain, sideslopes, toe slopes.
Typical Vegetation Series	Canyon Oak Woodland Low Montane & Foothill Mixed Chaparral	Douglas-fir-Pine Mixed Conifer Forest, Mixed Conifer Black Oak Forest

Soil Profile Description

Surface Soil	0-7" yellowish brown very gravelly loam, moderate medium subangular blocky structure, 40% gravel and cobbles, neutral.	0-13" brown heavy loam and gravelly light clay loam, moderate and weak medium granular structure, 5-35% gravel, slightly acid.
Subsoil	7-15" yellowish brown very gravelly loam, moderate medium subangular blocky structure, 55% gravel and cobbles, neutral.	13-26" light brown very gravelly clay loam, massive, 40-50% gravel, strongly acid.
Substratum	15-20" fractured metavolcanic rock.	26-32" fractured shale.

Soil Properties & Management Interpretations

Forest Survey Site Class	7	5
Adapted Species Group	BL	DF, PP, SP
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	0.7-1.9	2.0-4.5
AWC for Surface 24"	0.7-1.9	1.6-3.3
Seedling Survival Potential	V. Low-Low	Low-High
Plantability Potential	V. Low-Low	High-Moderate
Hydrologic Soil Group	D	B
Potential for Roadbed Damage	Low	Moderate
Inclusions (20%)	Neuns family Rubble land Rock outcrop, metamorphic	

Remarks:

84 Goulding-Neuns families association, 50 to 80 percent slopes

Map Unit Components	Goulding family (50%)	Neuns family (30%)
Geomorphic Position	Steep, dissected mountain sideslopes.	Steep to very steep, dissected mountain sideslopes.
Typical Vegetation Series	Canyon Oak Woodland Low Montane Mixed Chaparral	Douglas-fir-Pine Mixed Conifer Forest, Douglas-fir-Pine Canyon Oak Forest

Soil Profile Description

Surface Soil	0-7" yellowish brown very gravelly loam, moderate medium subangular blocky structure, 40% gravel and cobbles, neutral.	0-11" brown to light brown very gravelly sandy loam, weak to moderate medium granular structure, 35-45% gravel, slightly acid.
Subsoil	7-15" yellowish brown very gravelly loam, moderate medium subangular blocky structure, 55% gravel and cobbles, neutral.	11-23" light brown very gravelly sandy loam, moderate fine subangular blocky structure, 55% gravel and cobbles, slightly acid.
Substratum	15-20" fractured metavolcanic rock.	23-34" highly fractured, slightly weathered metamorphic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	7	5
Adapted Species Group	BL	DF, PP, SP
Soil Erodibility	Moderate	Low
AWC for Profile Depth	0.7-1.9	2.3-4.8
AWC for Surface 24"	0.7-1.9	1.6-3.2
Seedling Survival Potential	V. Low-Low	Low-Moderate
Plantability Potential	V. Low	Low
Hydrologic Soil Group	D	B
Potential for Roadbed Damage	Low	Moderate
Inclusions (20%)	Rock outcrop, metamorphic Typic Xerorthents, Hugo family, moderately deep	

Remarks:

85 Goulding family-Rock outcrop complex, 50 to 80 percent slopes

Map Unit Components	Goulding family (60%)	Rock outcrop (30%)
Geomorphic Position	Moderately steep to very steep, dissected mountain sideslopes.	Very steep dissected mountain sideslopes.
Typical Vegetation Series	Canyon Oak Woodland Low Montane and Foothill Mixed Chaparral	Low Montane Shrub

Soil Profile Description

Surface Soil	0-7" yellowish brown very gravelly loam, moderate medium subangular blocky structure, 40% gravel and cobbles, neutral.
Subsoil	7-15" yellowish brown very gravelly loam, moderate medium subangular blocky structure, 55% gravel and cobbles, neutral.
Substratum	15-20" fractured metavolcanic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	7	
Adapted Species Group	BL	
Soil Erodibility	Moderate	
AWC for Profile Depth	0.7-1.9	
AWC for Surface 24"	0.7-1.9	
Seedling Survival Potential	V. Low-Low	
Plantability Potential	V. Low	
Hydrologic Soil Group	D	D
Potential for Roadbed Damage	Low	Low
Inclusions (10%)	Etsel family	
Remarks:		

86 Gozem family-Rock outcrop-Toadlake family comp,ex, 30 to 70 percent slopes

Map Unit Components	Gozem family (35%)	Rock outcrop (25%)	Toadlake family (25%)
Geomorphic Position	Moderately steep to very steep, mountain ridge tops.	Similar topography as Gozem family.	Similar position as Gozem family.
Typical Vegetation Series	Upper Montane Serpentine Barrens open to moderately dense Huckleberry Oak Chaparral.	Woodland, Chaparral	Mixed Upper Montane Coniferous Forest, Jeffrey Pine-Incense Cedar Woodland.

Soil Profile Description

Surface Soil	0-4" yellowish brown very cobbly loam, moderate fine and medium subangular blocky structure, 35% gravel and cobbles, slightly acid.	0-10" grayish brown and light gray very gravelly loam, moderate very fine granular and very fine subangular blocky structure, 35-45% gravel and cobbles, slightly acid to neutral.
Subsoil	4-18" yellowish brown very cobbly and very gravelly loam, moderate to strong medium subangular blocky structure, 45-55% gravel and cobbles, neutral to slightly acid.	10-56" light brownish gray very gravelly sandy clay loam to light yellowish brown very gravelly clay loam, moderate fine to weak coarse subangular blocky structure, 45-50% gravel and cobbles, mildly alkaline.
Substratum	18-22"+ highly fractured serpentized peridotite bedrock.	56-59" hard, moderately fractured ultramafic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	7	5-6
Adapted Species Group	BL, GL	JP, WWP, WF
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	1.5-2.4	2.5-5.0
AWC for Surface 24"	1.5-2.4	2.3-3.0
Seedling Survival Potential	Low-Moderate	Moderate
Plantability Potential	V. Low	V. Low-Low
Hydrologic Soil Group	C	D
Potential for Roadbed Damage	Low Moderate	Low
Inclusions (15%)	Grell family Tamflat family	B
Remarks:	Serpentine mineralogy limits adapted species and productivity.	

87 Gozem-Toadlake families association, 20 to 40 percent slopes

Map Unit Components	Gozem family (50%)	Toadlake family (30%)
Geomorphic Position	Moderately steep broken slopes of cirques and ridge tops.	Similar topography as Gozem family.
Typical Vegetation Series	Upper Montane Serpentine Barrens, Very Open Jeffrey Pine - Woodland	Jeffrey Pine Mixed Conifer Forest Mixed Upper Montane Coniferous Forest

Soil Profile Description

Surface Soil	0-4" yellowish brown very cobbly loam moderate fine and medium subangular blocky structure, 35% gravel and cobbles, slightly acid.	0-10" grayish brown and light gray very gravelly loam, moderate very fine granular and very fine subangular blocky structure, 35-45% gravel and cobbles, slightly acid to neutral.
Subsoil	4-18" yellowish brown very cobbly and very gravelly loam, moderate to strong medium subangular blocky structure, 45 to 55% gravel and cobbles, neutral to slightly acid.	10-56" light brownish gray very gravelly sandy clay loam to light yellowish brown very gravelly clay loam, moderate fine to weak coarse subangular blocky structure, 45-50% gravel and cobbles, mildly alkaline.
Substratum	18-22"+ highly fractured serpentinized peridotite bedrock.	56-59" hard, moderately fractured ultramafic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	7	5-6
Adapted Species Group	BL, GL	JP, WWP, WF
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	1.5-2.4	2.5-5.0
AWC for Surface 24"	1.5-2.4	2.3-3.0
Seedling Survival Potential	Low-Moderate	Moderate
Plantability Potential	V. Low	High-Low
Hydrologic Soil Group	C	B
Potential for Roadbed Damage	Low	Moderate

Inclusions (20%) Grell family, Rock outcrop, ultramafic, Typic Cryaquolls

Remarks: Gozem limitation: Ca/Mg, poor aeration and possible toxicity. Toadlake limitation: Ca/Mg limits species and productivity.

88 Gozem-Toadlake families association, 40 to 60 percent slopes

Map Unit Components	Gozem family (50%)	Toadlake family (30%)
Geomorphic Position	Moderately steep broken slopes of cirques, ridge tops and lateral moraine deposits.	Similar topography as Gozem family.
Typical Vegetation Series	Upper Montane Serpentine Semi-Barrens, Very Open Jeffrey Pine - Woodland	Jeffrey Pine Mixed Conifer Forest Mixed Upper Montane Coniferous Forest

Soil Profile Description

Surface Soil	0-4" yellowish brown very cobbly loam moderate fine and medium subangular blocky structure, 35% gravel and cobbles, slightly acid.	0-10" grayish brown and light gray very gravelly loam, moderate very fine granular and very fine subangular blocky structure, 35-45% gravel and cobbles, slightly acid to neutral.
Subsoil	4-18" yellowish brown very cobbly and very gravelly loam, moderate to strong medium subangular blocky structure, 45 to 55% gravel and cobbles, neutral to slightly acid.	10-56" light brownish gray very gravelly sandy clay loam to light yellowish brown very gravelly clay loam, moderate fine to weak coarse subangular blocky structure, 45-50% gravel and cobbles, mildly alkaline.
Substratum	18-22"+ highly fractured serpentinized peridotite bedrock.	56-59" hard, moderately fractured ultramafic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	7	5-6
Adapted Species Group	BL, GL	JP, WWP, WF
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	1.5-2.4	2.5-5.0
AWC for Surface 24"	1.5-2.4	2.3-3.0
Seedling Survival Potential	Low-Moderate	Moderate
Plantability Potential	V. Low	V. Low-Low
Hydrologic Soil Group	C	B
Potential for Roadbed Damage	Low	Moderate

Inclusions (20%) Grell family, Rock outcrop, ultramafic, Typic Cryaquolls, Merkel family
Remarks: Gozem limitation: Ca/Mg, poor aeration and possible toxicity. Toadlake limitation: Ca/Mg limits species and productivity.

89 Grell family-Rock outcrop complex, 20 to 40 percent slopes

Map Unit Components	Grell family (55%)	Rock outcrop (20%)
Geomorphic Position	Moderately steep mountain sideslopes and ridge tops.	Moderately steep to steep mountain sideslopes and ridge tops.
Typical Vegetation Series	Upper Montane Serpentine Semi-Barrens	

Soil Profile Description

Surface Soil	0-12" grayish brown very gravelly sandy loam and brown very gravelly loam, weak coarse subangular blocky and weak very fine granular structure, 40-60% gravel cobbles, mildly to moderately alkaline.
Subsoil	
Substratum	12-16" moderately fractured, slightly weathered serpentine rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	7	
Adapted Species Group	GL, BL	
Soil Erodibility	Low	
AWC for Profile Depth	0.8-2.3	
AWC for Surface 24"	0.9-2.3	
Seedling Survival Potential	V.Low-Moderate	
Plantability Potential	Low	
Hydrologic Soil Group	C-D	D
Potential for Roadbed Damage	Low	Low
Inclusions (25%)	Beaughton family, Lithic Haploxerafals, Dubakella family, Kang family	
Remarks:	Grell limitations: Ca/Mg imbalance, possible toxicity, poor aeration, extreme cold and shallow depth.	

90 Henneke family, 20 to 40 percent slopes

Map Unit Components
Geomorphic Position
Typical Vegetation Series

Henneke family (75%)
Moderately steep, mountain sideslopes.
Serpentine Chaparral Low Montane
Serpentine Semi-Barrens

Soil Profile Description

Surface Soil
Subsoil
Substratum

0-5" brown gravelly loam, moderate fine and medium subangular blocky structure, 32% gravel and cobbles, moderately alkaline.
5-9" brown very gravelly clay, weak fine, medium and coarse subangular blocky structure, 45% gravel and cobbles moderately alkaline.
9-15" dark brown extremely gravelly loam, weak subangular blocky structure, 80% gravel and cobbles, moderately alkaline.
15-20" hard, fractured, serpentinized.

Soil Properties & Management Interpretations

Forest Survey Site Class
Adapted Species Group
Soil Erodibility
AWC for Profile Depth
AWC for Surface 24"
Seedling Survival Potential
Plantability Potential
Hydrologic Soil Group
Potential for Roadbed Damage
Inclusions (25%)
Remarks:

7
BL
Moderate
0.9-1.6
0.9-1.6
V.Low-Low
V.Low-Low
D
Low
Dubakella
Beaughton
Goulding Family
Rock outcrop, ultramafic
Weitchpec family

91 Henneke-Dubakella families complex, 40 to 60 percent slopes, eroded

Map Unit Components	Henneke family (60%)	Dubakella family (30%)
Geomorphic Position	Steep mountain sideslopes.	Steep mountain sideslopes.
Typical Vegetation Series	Serpentine Chaparral, Low Montane Serpentine Semi-Barrens	Jeffrey Pine - Incense Cedar Woodland

Soil Profile Description

Surface Soil	0-5" brown gravelly loam, moderate fine and medium subangular blocky structure, 32% gravel and cobbles, moderately alkaline.	0-11" reddish brown cobbly loam and very stony clay loam, weak and moderate very fine subangular blocky structure, 30 to 50% gravel, cobbles and stones, neutral.
Subsoil	5-9" brown very gravelly clay, weak fine, medium and coarse subangular blocky structure, 45% gravel and cobbles moderately alkaline.	11-18" strong brown extremely stony clay, strong fine subangular blocky structure, 65% gravel and stones, mildly alkaline.
Substratum	9-15" dark brown extremely gravelly loam, weak subangular blocky structure, 80% gravel and cobbles, moderately alkaline. 15-20" hard, fractured, serpentinized.	18-26" strong brown extremely stony clay, massive, 85% gravel and stones, mildly alkaline, 26-30" ultramafic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	7	5-6
Adapted Species Group	BL	JP, IC, DF
Soil Erodibility	Moderate	High
AWC for Profile Depth	0.9-1.6	1.8-4.2
AWC for Surface 24"	0.9-1.6	1.8-3.0
Seedling Survival Potential	V.Low-Low	Low-Moderate
Plantability Potential	V.Low-Low	Low
Hydrologic Soil Group	D	C
Potential for Roadbed Damage	Low	Moderate
Inclusions (10%)	Rock outcrop, ultramafic, Beaughton family, Weitchpec	
Remarks:	Dubakella & Henneke limitations: Ca/Mg imbalance.	

92 Henneke family-Rock outcrop complex, 60 to 80 percent slopes, eroded

Map Unit Components	Henneke family (60%)	Rock outcrop (30%)
Geomorphic Position	Very steep mountain sideslopes.	
Typical Vegetation Series	Serpentine Chaparral	

Soil Profile Description

Surface Soil	0-5" brown gravelly loam, moderate fine and medium subangular blocky structure, 32% gravel and cobbles, moderately alkaline.
Subsoil	5-9" brown very gravelly clay, weak fine, medium and coarse subangular blocky structure, 45% gravel and cobbles moderately alkaline.
Substratum	9-15" dark brown extremely gravelly loam, weak subangular blocky structure, 80% gravel and cobbles, moderately alkaline. 15-20" hard, fractured, serpentinized.

Soil Properties & Management Interpretations

Forest Survey Site Class	7	
Adapted Species Group	BL	
Soil Erodibility	Moderate	
AWC for Profile Depth	0.9-1.6	
AWC for Surface 24"	0.9-1.6	
Seedling Survival Potential	V.Low-Low	
Plantability Potential	V.Low-Low	
Hydrologic Soil Group	D	D
Potential for Roadbed Damage	Low	Low
Inclusions (10%)	Dubakella family, Beaughton family, Goulding family	
Remarks:	Henneke limitations: Ca/Mg imbalance, shallow depth, hot sites.	

93 Hohmann family, 40 to 60 percent slopes

Map Unit Components	Hohmann family (75%)
Geomorphic Position	Steep, highly dissected, linear, broken mountain slopes.
Typical Vegetation Series	Douglas-fir-Pine, Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-2" light brownish gray gravelly loam, weak medium subangular blocky structure, 20% pebbles and cobbles, medium acid.
Subsoil	2-22" light brownish gray silt loam and light gray gravelly silty clay loam, massive to weak medium and coarse subangular blocky structure, 10 to 30% gravel and cobbles, medium to strongly acid.
Substratum	22-24" fractured and weathered augite meta-andesite rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	5
Adapted Species Group	DF, PP, SP
Soil Erodibility	High
AWC for Profile Depth	3.3-5.5
AWC for Surface 24"	2.9-4.4
Seedling Survival Potential	Moderate-High
Plantability Potential	High
Hydrologic Soil Group	B
Potential for Roadbed Damage	High
Inclusions (25%)	Holland family, Brader family
Remarks:	

94 Hohmann-Brader families association, 40 to 60 percent slopes

Map Unit Components	Hohmann family (60%)	Brader family (30%)
Geomorphic Position	Highly dissected, broken, mountain sideslopes.	Steep, dissected mountain sideslopes.
Typical Vegetation Series	Douglas-fir-Pine, Mixed Conifer Forest	Greenleaf Manzanita Chaparral

Soil Profile Description

Surface Soil	0-2" light brownish gray gravelly loam, weak medium subangular blocky structure, 20% pebbles and cobbles, medium acid.	0-11" yellowish brown gravelly loam, moderate fine and medium subangular blocky structure, 17% gravel, slightly acid.
Subsoil	2-22" light brownish gray silt loam and light gray gravelly silty clay loam, massive to weak medium and coarse subangular blocky structure, 10 to 30% gravel and cobbles, medium to strongly acid.	11-19" yellowish brown gravelly heavy loam and light clay loam, moderate medium subangular blocky structure, 20-33% gravel, slightly to medium acid.
Substratum	22-24" fractured and weathered augite meta-andesite rock.	19-27" highly weathered meta-andesite bedrock.

Soil Properties & Management Interpretations

Forest Survey Site Class	5	7
Adapted Species Group	DF, PP, SP	BL
Soil Erodibility	High	Moderate
AWC for Profile Depth	3.3-5.5	2.0-2.8
AWC for Surface 24"	2.9-4.4	2.0-2.9
Seedling Survival Potential	Moderate-High	Low-Moderate
Plantability Potential	High	Low
Hydrologic Soil Group	B	C
Potential for Roadbed Damage	High	High
Inclusions (10%)	Soils similar to Hohmann with clay subsoil Soils similar to Brader with clay subsoil	

Remarks:

95 Hohmann-Hugo families complex, 40 to 60 percent slopes

Map Unit Components	Hohmann family (65%)	Hugo family (25%)
Geomorphic Position	Steep, highly dissected, linear, mountain sideslopes.	Position similar to Hohmann family.
Typical Vegetation Series	Douglas-fir-Pine, Mixed Conifer Forest	Douglas-fir-Pine Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-2" light brownish gray gravelly loam, weak medium subangular blocky structure, 20% pebbles and cobbles, medium acid.	0-4" brown loam, weak very fine granular structure, 10% gravel, medium acid.
Subsoil	2-22" light brownish gray silt loam and light gray gravelly silty clay loam, massive to weak medium and coarse subangular blocky structure, 10 to 30% gravel and cobbles, medium to strongly acid.	4-50" light yellowish brown loam to pale brown gravelly sandy clay loam, weak to moderate fine subangular blocky structure, 10-30% gravel, medium to strongly acid.
Substratum	22-24" fractured and weathered augite meta-andesite rock.	50-68" highly fractured slightly to moderately weathered metasediments.

Soil Properties & Management Interpretations

Forest Survey Site Class	5	3-4
Adapted Species Group	DF, PP, SP	WF, PP, SP, DF
Soil Erodibility	High	Moderate
AWC for Profile Depth	3.3-5.5	4.8-7.1
AWC for Surface 24"	2.9-4.4	3.1-3.9
Seedling Survival Potential	Moderate-High	High
Plantability Potential	High	High
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	High	High
Inclusions (10%)	Huntmount family Brader family	

Remarks:

96 Hohmann-Neuns families complex, 40 to 60 percent slopes

Map Unit Components	Hohmann family (50%)	Neuns family (30%)
Geomorphic Position	Steep, highly dissected, broken mountain sideslopes.	Position similar to Hohmann family.
Typical Vegetation Series	Douglas-fir-Pine, Mixed Conifer Forest	Douglas-fir-Pine Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-2" light brownish gray gravelly loam, weak medium subangular blocky structure, 20% pebbles and cobbles, medium acid.	0-11" brown to light brown very gravelly sandy loam, weak to moderate medium granular structure, 35-45% gravel, slightly acid.
Subsoil	2-22" light brownish gray silt loam and light gray gravelly silty clay loam, massive to weak medium and coarse subangular blocky structure, 10 to 30% gravel and cobbles, medium to strongly acid.	11-23" light brown very gravelly sandy loam, moderate fine subangular blocky structure, 55% gravel and cobbles, slightly acid.
Substratum	22-24" fractured and weathered augite meta-andesite rock.	23-34" highly fractured, slightly weathered metamorphic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	5	5
Adapted Species Group	DF, PP, SP	DF, PP, SP
Soil Erodibility	High	Low
AWC for Profile Depth	3.3-5.5	2.3-4.8
AWC for Surface 24"	2.9-4.4	1.6-3.2
Seedling Survival Potential	Moderate-High	Low-High
Plantability Potential	High	Moderate-High
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	High	Moderate
Inclusions (10%)	Holland family Brader family Hugo family	

Remarks:

97 Holland family, 20 to 40 percent slopes

Map Unit Components	Holland family (80%)
Geomorphic Position	Moderately steep mountain sideslopes, benches and toe slopes.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest, Mixed Conifer - Black Oak Forest

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, strong fine granular structure, 30% gravel, slightly acid.
Subsoil	3-18" light brown gravelly loam and gravelly clay loam, weak fine and moderate medium subangular blocky structure, 20 to 30% gravel, slightly to medium acid. 18-26" reddish yellow extremely gravelly sandy clay loam, moderate very fine subangular blocky structure, 70% gravel and cobbles, medium acid.
Substratum	26-30" highly fractured, moderately weathered metavolcanic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	4-5
Adapted Species Group	DF, PP, SP
Soil Erodibility	Moderate
AWC for Profile Depth	3.0-4.4
AWC for Surface 24"	2.7-4.1
Seedling Survival Potential	Moderate-High
Plantability Potential	High
Hydrologic Soil Group	B
Potential for Roadbed Damage	High
Inclusions (20%)	Holland family, deep Neuns family, deep Neuns family
Remarks:	

98 Holland family, 40 to 60 percent slopes

Map Unit Components	Holland family (75%)
Geomorphic Position	Steep mountain sideslopes, toe slopes, benches.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest, Mixed Conifer - Black Oak Forest

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, strong fine granular structure, 30% gravel, slightly acid.
Subsoil	3-18" light brown gravelly loam and gravelly clay loam, weak fine and moderate medium subangular blocky structure, 20 to 30% gravel, slightly to medium acid. 18-26" reddish yellow extremely gravelly sandy clay loam, moderate very fine subangular blocky structure, 70% gravel and cobbles, medium acid.
Substratum	26-30" highly fractured, moderately weathered metavolcanic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	4-5
Adapted Species Group	DF, PP, SP
Soil Erodibility	Moderate
AWC for Profile Depth	3.0-4.4
AWC for Surface 24"	2.7-4.1
Seedling Survival Potential	Moderate-High
Plantability Potential	High
Hydrologic Soil Group	B
Potential for Roadbed Damage	High
Inclusions (25%)	Holland family, deep Marpa family Neuns family Deadwood family
Remarks:	

99 Holland family, 60 to 80 percent slopes

Map Unit Components	Holland family (75%)
Geomorphic Position	Very steep, dissected mountain sideslopes.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest, Mixed Conifer - Black Oak Forest

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, strong fine granular structure, 30% gravel, slightly acid.
Subsoil	3-18" light brown gravelly loam and gravelly clay loam, weak fine and moderate medium subangular blocky structure, 20 to 30% gravel, slightly to medium acid. 18-26" reddish yellow extremely gravelly sandy clay loam, moderate very fine subangular blocky structure, 70% gravel and cobbles, medium acid.
Substratum	26-30" highly fractured, moderately weathered metavolcanic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	4-5
Adapted Species Group	DF, PP, SP
Soil Erodibility	Moderate
AWC for Profile Depth	3.0-4.4
AWC for Surface 24"	2.7-4.1
Seedling Survival Potential	Moderate-High
Plantability Potential	High
Hydrologic Soil Group	B
Potential for Roadbed Damage	High
Inclusions (25%)	Hugo family, moderately deep Holland, deep Marpa family, Neuns family, Typic Xerorthent, Hugo family

Remarks:

100 Holland, granitic-Chawanakee families complex, 60 to 80 percent slopes

Map Unit Components	Holland family, granitic (45%)	Chawanakee family (30%)
Geomorphic Position	Very steep, dissected mountain sideslopes.	Very steep, dissected mountain sideslopes.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest	Whiteleaf Manzanita Chaparral Low Montane & Mixed Chaparral

Soil Profile Description

Surface Soil	0-15" light yellowish brown sandy loam and heavy coarse sandy loam, moderate fine and medium granular structure, to massive, 10 to 14% gravel and cobbles, medium acid.	0-6" light brownish gravelly sandy loam and light gray gravelly loam, weak fine and medium subangular blocky structure 25-30% gravel and cobbles, very strongly acid.
Subsoil	15-28" yellow gravelly sandy clay loam, massive, 17% gravel and cobbles, medium acid.	6-11" very pale brown cobbly loam, weak medium and coarse subangular blocky structure, 30% gravel and cobbles, very strongly acid.
Substratum	28-35" decomposed granitic rock, highly weathered. 35-45" slightly weathered diorite bedrock.	11-20" highly fractured rhyolite bedrock.

Soil Properties & Management Interpretations

Forest Survey Site Class	4-5	6-7
Adapted Species Group	DF, PP, SP	BL, DF, PP, SP
Soil Erodibility	High	Moderate
AWC for Profile Depth	3.8-5.0	1.1-1.6
AWC for Surface 24"	2.4-3.0	1.1-1.9
Seedling Survival Potential	Moderate-High	Low
Plantability Potential	Low	Low
Hydrologic Soil Group	B	C
Potential for Roadbed Damage	V. High	High
Inclusions (25%)	Chaix family Hugo family	

101 Holland-Goulding families association, 20 to 40 percent slopes

Map Unit Components	Holland family (60%)	Goulding family (30%)
Geomorphic Position	Moderately steep mountain sideslopes, benches toe slopes.	Moderately steep, dissected mountain sideslopes.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest	Low Montane & Foothill Mixed Chaparral, Canyon Oak Woodland

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, strong fine granular structure, 30% gravel, slightly acid.	0-7" yellowish brown very gravelly loam, moderate medium subangular blocky structure, 40% gravel and cobbles, neutral.
Subsoil	3-18" light brown gravelly loam and gravelly clay loam, weak fine and moderate medium subangular blocky structure, 20 to 30% gravel, slightly to medium acid. 18-26" reddish yellow extremely gravelly sandy clay loam, moderate very fine subangular blocky structure, 70% gravel and cobbles, medium acid.	7-15" yellowish brown very gravelly loam, moderate medium subangular blocky structure, 55% gravel and cobbles, neutral.
Substratum	26-30" highly fractured, moderately weathered metavolcanic rock.	15-20" fractured metavolcanic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	4-5	7
Adapted Species Group	DF, PP, SP	BL
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	3.0-4.4	0.7-1.9
AWC for Surface 24"	2.7-4.1	0.7-1.9
Seedling Survival Potential	Moderate-High	V. Low-Low
Plantability Potential	High	Low
Hydrologic Soil Group	B	D
Potential for Roadbed Damage	High	Low
Inclusions (10%)	Rock outcrop, metamorphic Deadwood family Neuns family	

Remarks:

102 Holland-Goulding families association, 40 to 60 percent slopes

Map Unit Components	Holland family (60%)	Goulding family (30%)
Geomorphic Position	Steep, highly dissected, linear, to broken mountain sideslopes.	Ridge tops and dissected mountain sideslopes.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest	Low Montane & Foothill Mixed Chaparral, Canyon Oak Woodland

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, strong fine granular structure, 30% gravel, slightly acid.	0-7" yellowish brown very gravelly loam, moderate medium subangular blocky structure, 40% gravel and cobbles, neutral.
Subsoil	3-18" light brown gravelly loam and gravelly clay loam, weak fine and moderate medium subangular blocky structure, 20 to 30% gravel, slightly to medium acid. 18-26" reddish yellow extremely gravelly sandy clay loam, moderate very fine subangular blocky structure, 70% gravel and cobbles, medium acid.	7-15" yellowish brown very gravelly loam, moderate medium subangular blocky structure, 55% gravel and cobbles, neutral.
Substratum	26-30" highly fractured, moderately weathered metavolcanic rock.	15-20" fractured metavolcanic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	4-5	7
Adapted Species Group	DF, PP, SP	BL
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	3.0-4.4	0.7-1.9
AWC for Surface 24"	2.7-4.1	0.7-1.9
Seedling Survival Potential	Moderate-High	V. Low-Low
Plantability Potential	High	V. Low-Low
Hydrologic Soil Group	B	D
Potential for Roadbed Damage	High	Low
Inclusions (10%)	Rock outcrop, metamorphic Rubble land Deadwood family Neuns family	

Remarks:

103 Holland-Goulding families association, 60 to 80 percent slopes

Map Unit Components	Holland family (60%)	Goulding family (30%)
Geomorphic Position	Very steep, dissected mountain sideslopes.	Ridge tops and very steep, dissected mountain sideslopes.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest	Low Montane & Foothill Mixed Chaparral, Canyon Oak Woodland

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, strong fine granular structure, 30% gravel, slightly acid.	0-7" yellowish brown very gravelly loam, moderate medium subangular blocky structure, 40% gravel and cobbles, neutral.
Subsoil	3-18" light brown gravelly loam and gravelly clay loam, weak fine and moderate medium subangular blocky structure, 20 to 30% gravel, slightly to medium acid. 18-26" reddish yellow extremely gravelly sandy clay loam, moderate very fine subangular blocky structure, 70% gravel and cobbles, medium acid.	7-15" yellowish brown very gravelly loam, moderate medium subangular blocky structure, 55% gravel and cobbles, neutral.
Substratum	26-30" highly fractured, moderately weathered metavolcanic rock.	15-20" fractured metavolcanic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	4-5	7
Adapted Species Group	DF, PP, SP	BL
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	3.0-4.4	0.7-1.9
AWC for Surface 24"	2.7-4.1	0.7-1.9
Seedling Survival Potential	Moderate-High	V. Low-Low
Plantability Potential	Low	V. Low-Low
Hydrologic Soil Group	B	D
Potential for Roadbed Damage	High	Low
Inclusions (10%)	Rock outcrop, metamorphic Rubble land Deadwood family Neuns family	

Remarks:

104 Holland-Holland family, deep complex, 20 to 40 percent slopes

Map Unit Components	Holland family (60%)	Holland family, deep (30%)
Geomorphic Position	Moderately steep mountain sideslopes, toe slopes, and benches.	Position similar to Holland family.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest, Mixed Conifer - Black Oak Forest	Douglas-fir-Pine Mixed Conifer - Black Oak Forest

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, strong fine granular structure, 30% gravel, slightly acid.	0-3" brown gravelly loam, strong medium granular structure, 20% gravel and cobbles, neutral.
Subsoil	3-18" light brown gravelly loam and gravelly clay loam, weak fine and moderate medium subangular blocky structure, 20 to 30% gravel, slightly to medium acid. 18-26" reddish yellow extremely gravelly sandy clay loam, moderate very fine subangular blocky structure, 70% gravel and cobbles, medium acid.	3-46" light brown to reddish yellow gravelly clay loam and cobbly clay loam, moderate medium and coarse subangular blocky structure, 15 to 20% gravel and cobbles, slightly acid.
Substratum	26-30" highly fractured, moderately weathered metavolcanic rock.	46-50" reddish yellow extremely cobbly clay loam, strong medium subangular blocky structure, 65% gravel and cobbles, slightly acid.

Soil Properties & Management Interpretations

Forest Survey Site Class	4-5	3-4
Adapted Species Group	DF, PP, SP	DF, PP, SP
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	3.0-4.4	6.0-9.7
AWC for Surface 24"	2.7-4.1	2.0-5.0
Seedling Survival Potential	Moderate-High	Moderate-High
Plantability Potential	High	High
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	High	High
Inclusions (10%)	Marpa family Hugo family	

Remarks:

105 Holland-Holland family, deep complex, 40 to 60 percent slopes

Map Unit Components	Holland family (60%)	Holland family, deep (30%)
Geomorphic Position	Steep, dissected mountain sideslopes.	Steep, dissected mountain sideslopes, toe slopes.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest, Mixed Conifer - Black Oak Forest	Douglas-fir-Pine Mixed Conifer - Mixed Conifer Black Oak Forest

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, strong fine granular structure, 30% gravel, slightly acid.	0-3" brown gravelly loam, strong medium granular structure, 20% gravel and cobbles, neutral.
Subsoil	3-18" light brown gravelly loam and gravelly clay loam, weak fine and moderate medium subangular blocky structure, 20 to 30% gravel, slightly to medium acid. 18-26" reddish yellow extremely gravelly sandy clay loam, moderate very fine subangular blocky structure, 70% gravel and cobbles, medium acid.	3-46" light brown to reddish yellow gravelly clay loam and cobbly clay loam, moderate medium and coarse subangular blocky structure, 15 to 20% gravel and cobbles, slightly acid.
Substratum	26-30" highly fractured, moderately weathered metavolcanic rock.	46-50" reddish yellow extremely cobbly clay loam, strong medium subangular blocky structure, 65% gravel and cobbles, slightly acid.

Soil Properties & Management Interpretations

Forest Survey Site Class	4-5	3-4
Adapted Species Group	DF, PP, SP	DF, PP, SP
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	3.0-4.4	6.0-9.7
AWC for Surface 24"	2.7-4.1	2.0-5.0
Seedling Survival Potential	Moderate-High	Moderate-High
Plantability Potential	Moderate-High	High
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	High	High
Inclusions (10%)	Hugo family Neuns family Marpa family	

Remarks:

106 Holland-Neuns families complex, 20 to 40 percent slopes

Map Unit Components	Holland family (60%)	Neuns family (30%)
Geomorphic Position	Moderately steep mountain sideslopes, toe slopes, benches.	Moderately steep mountain sideslopes, toe slopes, benches.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest	Douglas-fir-Pine Mixed Conifer

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, strong fine granular structure, 30% gravel, slightly acid.	0-11" brown to light brown very gravelly sandy loam, weak to moderate medium granular structure, 35-45% gravel, slightly acid.
Subsoil	3-18" light brown gravelly loam and gravelly clay loam, weak fine and moderate medium subangular blocky structure, 20 to 30% gravel, slightly to medium acid. 18-26" reddish yellow extremely gravelly sandy clay loam, moderate very fine subangular blocky structure, 70% gravel and cobbles, medium acid.	11-23" light brown very gravelly sandy loam, moderate fine subangular blocky structure, 55% gravel and cobbles, slightly acid.
Substratum	26-30" highly fractured, moderately weathered metavolcanic rock.	23-34" highly fractured, slightly weathered metamorphic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	4-5	5
Adapted Species Group	DF, PP, SP	DF, PP, SP
Soil Erodibility	Moderate	Low
AWC for Profile Depth	3.0-4.4	2.3-4.8
AWC for Surface 24"	2.7-4.1	1.6-3.2
Seedling Survival Potential	Moderate-High	Low-High
Plantability Potential	High	High
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	High	Moderate
Inclusions (10%)	Holland, deep Marpa family Hugo family Hugo family, moderately deep	

Remarks:

107 Holland-Neuns families complex, 40 to 60 percent slopes

Map Unit Components	Holland family (50%)	Neuns family (30%)
Geomorphic Position	Steep mountain sideslopes, toe slopes.	Steep mountain sideslopes.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest	Douglas-fir-Pine Mixed Conifer

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, strong fine granular structure, 30% gravel, slightly acid.	0-11" brown to light brown very gravelly sandy loam, weak to moderate medium granular structure, 35-45% gravel, slightly acid.
Subsoil	3-18" light brown gravelly loam and gravelly clay loam, weak fine and moderate medium subangular blocky structure, 20 to 30% gravel, slightly to medium acid. 18-26" reddish yellow extremely gravelly sandy clay loam, moderate very fine subangular blocky structure, 70% gravel and cobbles, medium acid.	11-23" light brown very gravelly sandy loam, moderate fine subangular blocky structure, 55% gravel and cobbles, slightly acid.
Substratum	26-30" highly fractured, moderately weathered metavolcanic rock.	23-34" highly fractured, slightly weathered metamorphic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	4-5	5
Adapted Species Group	DF, PP, SP	DF, PP, SP
Soil Erodibility	Moderate	Low
AWC for Profile Depth	3.0-4.4	2.3-4.8
AWC for Surface 24"	2.7-4.1	1.6-3.2
Seedling Survival Potential	Moderate-High	Low-High
Plantability Potential	High	Moderate-High
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	High	Moderate
Inclusions (20%)	Holland family, deep Marpa family Deadwood family	

Remarks:

108 Holland-Neuns families complex, 60 to 80 percent slopes

Map Unit Components
 Geomorphic Position
 Typical Vegetation Series

Holland family (45%)

Very steep mountain sideslopes.

Douglas-fir-Pine Mixed Conifer Forest

Neuns family (30%)

Very steep mountain sideslopes.

Douglas-fir-Pine Mixed Conifer

Soil Profile Description

Surface Soil

0-3" brown gravelly loam, strong fine granular structure, 30% gravel, slightly acid.

0-11" brown to light brown very gravelly sandy loam, weak to moderate medium granular structure, 35-45% gravel, slightly acid.

Subsoil

3-18" light brown gravelly loam and gravelly clay loam, weak fine and moderate medium subangular blocky structure, 20 to 30% gravel, slightly to medium acid.

11-23" light brown very gravelly sandy loam, moderate fine subangular blocky structure, 55% gravel and cobbles, slightly acid.

18-26" reddish yellow extremely gravelly sandy clay loam, moderate very fine subangular blocky structure, 70% gravel and cobbles, medium acid.

Substratum

26-30" highly fractured, moderately weathered metavolcanic rock.

23-34" highly fractured, slightly weathered metamorphic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class

4-5

5

Adapted Species Group

DF, PP, SP

DF, PP, SP

Soil Erodibility

Moderate

Low

AWC for Profile Depth

3.0-4.4

2.3-4.8

AWC for Surface 24"

2.7-4.1

1.6-3.2

Seedling Survival Potential

Moderate-High

Low-High

Plantability Potential

High

Moderate-High

Hydrologic Soil Group

B

B

Potential for Roadbed Damage

High

Moderate

Inclusions (25%)

Marpa family
 Deadwood family
 Rubble land
 Rock outcrop, metamorphic

Remarks:

109 Holland family, ashy, 0 to 20 percent slopes

Map Unit Components	Holland family, ashy (75%)
Geomorphic Position	Gently sloping dissected mountain sideslopes.
Typical Vegetation Series	Sierran-Cascade Mixed Conifer Forest, Ponderosa Pine Forest

Soil Profile Description

Surface Soil	0-13" reddish brown and yellowish red sandy loam, weak medium subangular blocky structure, 5% gravel, slightly acid.
Subsoil	13-40" yellowish red sandy clay loam, moderate medium subangular blocky structure, 15 to 25% gravel, slightly acid.
Substratum	40-41" paralithic contact with metasediments or volcanic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-4
Adapted Species Group	PP, DF, SP, WF
Soil Erodibility	High
AWC for Profile Depth	4.1-9.8
AWC for Surface 24"	2.5-3.6
Seedling Survival Potential	Moderate-High
Plantability Potential	High
Hydrologic Soil Group	B
Potential for Roadbed Damage	High
Inclusions (25%)	Sadie family, deep Neer family
Remarks:	Commonly has 5-8" ashy overburden which reduces compaction hazard. Holland family, ashy includes a cobbly phase.

110 Holland family, ashy, 20 to 40 percent slopes

Map Unit Components	Holland family, ashy (75%)
Geomorphic Position	Moderately steep rolling hills and dissected mountain sideslopes.
Typical Vegetation Series	Sierran-Cascade Mixed Conifer Forest, Black Oak Forest

Soil Profile Description

Surface Soil	0-13" reddish brown and yellowish red sandy loam, weak medium subangular blocky structure, 5% gravel, slightly acid.
Subsoil	13-40" yellowish red sandy clay loam, moderate medium subangular blocky structure, 15 to 25% gravel, slightly acid.
Substratum	40-41" paralithic contact with metasediments or volcanic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-4
Adapted Species Group	PP, DF, SP, WF
Soil Erodibility	High
AWC for Profile Depth	4.1-9.8
AWC for Surface 24"	2.5-3.6
Seedling Survival Potential	Moderate-High
Plantability Potential	High
Hydrologic Soil Group	B
Potential for Roadbed Damage	High
Inclusions (25%)	Neer family Sadie family
Remarks:	Commonly has 5-8" ashy overburden which reduces compaction hazard. Holland family, ashy includes a cobbly phase.

111 Holland, ashy-Ledmount families association, 0 to 20 percent slopes

Map Unit Components	Holland family, ashy (60%)	Ledmount family (30%)
Geomorphic Position	Gently sloping mountain sideslopes.	Gently sloping lava flows.
Typical Vegetation Series	Ponderosa Pine - Black Oak Forest	Greenleaf Manzanita Chaparral Digger Pine Woodland

Soil Profile Description

Surface Soil	0-13" reddish brown and yellowish red sandy loam, weak medium subangular blocky structure, 5% gravel, slightly acid.	0-9" dark brown fine sandy loam to brown cobbly sandy loam, single grain to weak medium and coarse subangular blocky structure, 15-25% gravel and cobbles, slightly to medium acid.
Subsoil	13-40" yellowish red sandy clay loam, moderate medium subangular blocky structure, 15 to 25% gravel, slightly acid.	9-13" yellowish brown cobbly sandy loam, weak medium and coarse subangular blocky structure, 25% cobbles and gravel, medium acid.
Substratum	40-41" paralithic contact with metasediments or volcanic rock.	13-14" fractured basalt bedrock.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-4	7
Adapted Species Group	PP, DF, SP, WF	BL
Soil Erodibility	High	Moderate
AWC for Profile Depth	4.1-9.8	0.9-1.1
AWC for Surface 24"	2.5-3.6	0.9-1.1
Seedling Survival Potential	Moderate-High	V. Low-Low
Plantability Potential	High	V. Low-Low
Hydrologic Soil Group	B	D
Potential for Roadbed Damage	High	Low
Inclusions (10%)	Rock outcrop, volcanic Holland family	
Remarks:	Occurs on remnant basalt flow along the Sacramento River Canyon.	

112 Holland, ashy-Neer families, association, 0 to 25 percent slopes

Map Unit Components	Holland family, ashy (60%)	Neer family (30%)
Geomorphic Position	Gently sloping rolling hills and mountain sideslopes.	Moderately steep mountain sideslopes.
Typical Vegetation Series	Mixed Conifer - Fir Forest Sierran-Cascade Mixed Conifer Forest	White Fir Forest, Sierran-Cascade Mixed Conifer Forest, Upper Montane Mixed Chaparral

Soil Profile Description

Surface Soil	0-13" reddish brown and yellowish red sandy loam, weak medium subangular blocky structure, 5% gravel, slightly acid.	0-9" dark brown to yellowish brown gravelly sandy loam, moderate fine granular to weak medium subangular blocky structure, 30% gravel, medium acid.
Subsoil	13-40" yellowish red sandy clay loam, moderate medium subangular blocky structure, 15 to 25% gravel, slightly acid.	9-26" light yellowish brown gravelly and very gravelly sandy loam, weak medium subangular blocky structure, 35-40% gravel, medium acid.
Substratum	40-41" paralithic contact with metasediments or volcanic rock.	26-35" extrusive igneous rock, paralithic contact.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-4	5
Adapted Species Group	PP, DF, SP, WF	PP
Soil Erodibility	High	Low
AWC for Profile Depth	4.1-9.8	1.6-3.6
AWC for Surface 24"	2.5-3.6	1.4-2.1
Seedling Survival Potential	Moderate-High	Low-Moderate
Plantability Potential	High	Moderate-High
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	High	Low
Inclusions (10%)	Sadie family Morical family	
Remarks:	Mapped in an area of frequent faults, Holland, ashy on relict surfaces, Neer on fault slopes. Includes area mapped by Soil-Veg. Survey as Asta.	

113 Holland, ashy-Neer families complex, 25 to 50 percent slopes

Map Unit Components	Holland family, ashy (60%)	Neer family (30%)
Geomorphic Position	Moderately steep rolling hills and dissected mountain sideslopes.	Steep sideslopes of lava flows.
Typical Vegetation Series	White Fir Forest Sierran-Cascade Mixed Conifer Forest	White Fir Forest, Sierran-Cascade Mixed Conifer Forest, Upper Montane Mixed Chaparral

Soil Profile Description

Surface Soil	0-13" reddish brown and yellowish red sandy loam, weak medium subangular blocky structure, 5% gravel, slightly acid.	0-9" dark brown to yellowish brown gravelly sandy loam, moderate fine granular to weak medium subangular blocky structure, 30% gravel, medium acid.
Subsoil	13-40" yellowish red sandy clay loam, moderate medium subangular blocky structure, 15 to 25% gravel, slightly acid.	9-26" light yellowish brown gravelly and very gravelly sandy loam, weak medium subangular blocky structure, 35-40% gravel, medium acid.
Substratum	40-41" paralithic contact with metasediments or volcanic rock.	26-35" extrusive igneous rock, paralithic contact.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-4	5
Adapted Species Group	PP, DF, SP, WF	PP
Soil Erodibility	High	Low
AWC for Profile Depth	4.1-9.8	1.6-3.6
AWC for Surface 24"	2.5-3.6	1.4-2.1
Seedling Survival Potential	Moderate-High	Low-Moderate
Plantability Potential	Low-High	Low-Moderate
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	High	Low
Inclusions (10%)	Sadie family Germany family	
Remarks:	Includes bouldery phase which may have limitations for brush clearing.	

114 Holland, ashy-Washougal families complex, 25 to 65 percent slopes

Map Unit Components	Holland family, ashy (55%)	Washougal family (25%)
Geomorphic Position	Gently sloping to very steep slopes of old dissected lava flows.	Gently sloping to very steep dissected lava flows.
Typical Vegetation Series	Mixed Conifer - Fir Forest Sierran-Cascade Mixed Conifer Forest	Mixed Conifer - Fir Forest Upper Montane Mixed Chaparral

Soil Profile Description

Surface Soil	0-13" reddish brown and yellowish red sandy loam, weak medium subangular blocky structure, 5% gravel, slightly acid.	0-10" dark brown gravelly loam and very cobbly fine sandy loam, weak fine subangular blocky structure, 15 to 65% cobbles and gravel, neutral to slightly acid.
Subsoil	13-40" yellowish red sandy clay loam, moderate medium subangular blocky structure, 15 to 25% gravel, slightly acid.	10-30" brown extremely cobbly fine sandy loam, weak very fine subangular blocky structure, 70% cobbles and gravel, neutral.
Substratum	40-41" paralithic contact with metasediments or volcanic rock.	30-32" fractured basalt.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-4	5
Adapted Species Group	PP, DF, SP, WF	PP
Soil Erodibility	High	Moderate
AWC for Profile Depth	4.1-9.8	1.6-3.4
AWC for Surface 24"	2.5-3.6	1.4-2.3
Seedling Survival Potential	Moderate-High	Low-Moderate
Plantability Potential	High	Low
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	High	Low
Inclusions (20%)	Neer family Germany family, deep	
Remarks:	Occurs on the river terraces. Holland family, ashy includes a cobbly phase.	

115 Holland family, deep 0 to 20 percent slopes

Map Unit Components	Holland family, deep (75%)
Geomorphic Position	Gently sloping benches, toe slopes.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest, Sierran-Cascade Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, strong medium granular structure, 20% gravel and cobbles, neutral.
Subsoil	3-46" light brown to reddish yellow gravelly clay loam and cobbly clay loam, moderate medium and coarse subangular blocky structure, 15 to 20% gravel and cobbles, slightly acid.
Substratum	46-50" reddish yellow extremely cobbly clay loam, strong medium subangular blocky structure, 65% gravel and cobbles, slightly acid.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-4
Adapted Species Group	DF, PP, SP
Soil Erodibility	Moderate
AWC for Profile Depth	6.0-9.7
AWC for Surface 24"	2.0-5.0
Seedling Survival Potential	Moderate-High
Plantability Potential	High
Hydrologic Soil Group	B
Potential for Roadbed Damage	High
Inclusions (25%)	Hugo family Holland family Marpa family, deep Marpa family

Remarks:

116 Holland family, deep 20 to 40 percent slopes

Map Unit Components	Holland family, deep (75%)
Geomorphic Position	Dissected, moderately steep, linear to broken slopes and benches.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest, Sierran-Cascade Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, strong medium granular structure, 20% gravel and cobbles, neutral.
Subsoil	3-46" light brown to reddish yellow gravelly clay loam and cobbly clay loam, moderate medium and coarse subangular blocky structure, 15 to 20% gravel and cobbles, slightly acid.
Substratum	46-50" reddish yellow extremely cobbly clay loam, strong medium subangular blocky structure, 65% gravel and cobbles, slightly acid.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-4
Adapted Species Group	DF, PP, SP
Soil Erodibility	Moderate
AWC for Profile Depth	6.0-9.7
AWC for Surface 24"	2.0-5.0
Seedling Survival Potential	Moderate-High
Plantability Potential	Moderate-High
Hydrologic Soil Group	B
Potential for Roadbed Damage	High
Inclusions (25%)	Holland family Marpa family, deep Marpa family
Remarks:	Mapped on metamorphic, ultramafic, basic igneous intrusive rocks and on mixed alluvium.

117 Holland family, deep, 40 to 60 percent slopes

Map Unit Components	Holland family, deep (75%)
Geomorphic Position	Steep, linear to broken sideslopes.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest, Sierran-Cascade Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, strong medium granular structure, 20% gravel and cobbles, neutral.
Subsoil	3-46" light brown to reddish yellow gravelly clay loam and cobbly clay loam, moderate medium and coarse subangular blocky structure, 15 to 20% gravel and cobbles, slightly acid.
Substratum	46-50" reddish yellow extremely cobbly clay loam, strong medium subangular blocky structure, 65% gravel and cobbles, slightly acid.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-4
Adapted Species Group	DF, PP, SP
Soil Erodibility	Moderate
AWC for Profile Depth	6.0-9.7
AWC for Surface 24"	2.0-5.0
Seedling Survival Potential	Moderate-High
Plantability Potential	High
Hydrologic Soil Group	B
Potential for Roadbed Damage	High
Inclusions (25%)	Hugo family Marpa family, deep Marpa family Ovall family Hugo family, moderately deep
Remarks:	

118 Holland family, deep, 60 to 80 percent slopes

Map Unit Components	Holland family, deep (75%)
Geomorphic Position	Very steep mountain sideslopes.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest, Sierran-Cascade Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, strong medium granular structure, 20% gravel and cobbles, neutral.
Subsoil	3-46" light brown to reddish yellow gravelly clay loam and cobbly clay loam, moderate medium and coarse subangular blocky structure, 15 to 20% gravel and cobbles, slightly acid.
Substratum	46-50" reddish yellow extremely cobbly clay loam, strong medium subangular blocky structure, 65% gravel and cobbles, slightly acid.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-4
Adapted Species Group	DF, PP, SP
Soil Erodibility	Moderate
AWC for Profile Depth	6.0-9.7
AWC for Surface 24"	2.0-5.0
Seedling Survival Potential	Moderate-High
Plantability Potential	High
Hydrologic Soil Group	B
Potential for Roadbed Damage	High
Inclusions (25%)	Neuns family Holland family Marpa family, deep Marpa family

Remarks:

119 Holland family, deep - Holland family complex, 20 to 40 percent slopes

Map Unit Components	Holland family, deep (60%)	Holland family (30%)
Geomorphic Position	Moderately steep mountain sideslopes, toe slopes, and benches.	Moderately steep mountain sideslopes, benches.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest	Douglas-fir-Pine Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, strong medium granular structure, 20% gravel and cobbles, neutral.	0-3" brown gravelly loam, strong fine granular structure, 30% gravel, slightly acid.
Subsoil	3-46" light brown to reddish yellow gravelly clay loam and cobbly clay loam, moderate medium and coarse subangular blocky structure 15 to 20% gravel and cobbles, slightly acid.	3-18" light brown gravelly loam and gravelly clay loam, weak fine and moderate medium subangular blocky structure, 20 to 30% gravel, slightly to medium acid. 18-26" reddish yellow extremely gravelly sandy clay loam, moderate very fine subangular blocky structure, 70% gravel and cobbles, medium acid.
Substratum	46-50" reddish yellow extremely cobbly clay loam, strong medium subangular blocky structure, 65% gravel and cobbles, slightly acid.	26-30" highly fractured, moderately weathered metavolcanic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-4	4-5
Adapted Species Group	DF, PP, SP	DF, PP, SP
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	6.0-9.7	3.0-4.4
AWC for Surface 24"	2.0-5.0	2.7-4.1
Seedling Survival Potential	Moderate-High	Moderate-High
Plantability Potential	High	High
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	High	High
Inclusions (10%)	Neuns family, deep Marpa family Marpa family, deep	

Remarks:

120 Holland family, deep - Holland family complex, 40 to 60 percent slopes

Map Unit Components	Holland family, deep (50%)	Holland family (30%)
Geomorphic Position	Steep dissected, linear to broken mountain sideslopes, toe slopes, and benches.	Simple steep moderately dissected convex, smooth to undulating sideslopes, toe slopes, and benches.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest	Douglas-fir-Pine Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, strong medium granular structure, 20% gravel and cobbles, neutral.	0-3" brown gravelly loam, strong fine granular structure, 30% gravel, slightly acid.
Subsoil	3-46" light brown to reddish yellow gravelly clay loam and cobbly clay loam, moderate medium and coarse subangular blocky structure 15 to 20% gravel and cobbles, slightly acid.	3-18" light brown gravelly loam and gravelly clay loam, weak fine and moderate medium subangular blocky structure, 20 to 30% gravel, slightly to medium acid. 18-26" reddish yellow extremely gravelly sandy clay loam, moderate very fine subangular blocky structure, 70% gravel and cobbles, medium acid.
Substratum	46-50" reddish yellow extremely cobbly clay loam, strong medium subangular blocky structure, 65% gravel and cobbles, slightly acid.	26-30" highly fractured, moderately weathered metavolcanic rock.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-4	4-5
Adapted Species Group	DF, PP, SP	DF, PP, SP
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	6.0-9.7	3.0-4.4
AWC for Surface 24"	2.0-5.0	2.7-4.1
Seedling Survival Potential	Moderate-High	Moderate-High
Plantability Potential	Moderate-High	Moderate-High
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	High	High
Inclusions (20%)	Neuns family, deep Marpa family Marpa family, deep Neuns family	

Remarks:

121 Holland, deep-Hugo families complex, 20 to 40 percent slopes

Map Unit Components	Holland family, deep (55%)	Hugo family (35%)
Geomorphic Position	Moderately steep mountain sideslopes and benches.	Moderately steep mountain sideslopes and benches.
Typical Vegetation Series	Douglas-fir Forest, Douglas- Fir-Pine Mixed Conifer Forest	Douglas-fir Forest, Douglas- Fir-Pine Mixed Conifer Forest

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, strong medium granular structure, 20% gravel and cobbles, neutral.	0-4" brown loam, weak very fine granular structure, 10% gravel, medium acid.
Subsoil	3-46" light brown to reddish yellow gravelly clay loam and cobbly clay loam, moderate medium and coarse subangular blocky structure 15 to 20% gravel and cobbles, slightly acid.	4-50" light yellowish brown loam to pale brown gravelly sandy clay loam, weak to moderate fine subangular blocky structure, 10-30% gravel, medium to strongly acid.
Substratum	46-50" reddish yellow extremely cobbly clay loam, strong medium subangular blocky structure, 65% gravel and cobbles, slightly acid.	50-68" highly fractured slightly to moderately weathered metasediments.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-4	3-4
Adapted Species Group	DF, PP, SP	DF, PP, SP
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	6.0-9.7	4.0-7.5
AWC for Surface 24"	2.0-5.0	2.4-4.1
Seedling Survival Potential	Moderate-High	Moderate-High
Plantability Potential	High	High
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	High	High
Inclusions (10%)	Holland family Marpa family, deep Neuns family Neuns family, deep	

Remarks:

122 Holland, deep-Hugo families complex, 40 to 60 percent slopes

Map Unit Components	Holland family, deep (60%)	Hugo family (30%)
Geomorphic Position	Steep, dissected mountain sideslopes.	Steep, dissected mountain sideslopes.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest, Mixed Conifer Black Oak Forest	Douglas-fir-Pine Mixed Conifer Forest, Mixed Conifer Black Oak Forest

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, strong medium granular structure, 20% gravel and cobbles, neutral.	0-4" brown loam, weak very fine granular structure, 10% gravel, medium acid.
Subsoil	3-46" light brown to reddish yellow gravelly clay loam and cobbly clay loam, moderate medium and coarse subangular blocky structure 15 to 20% gravel and cobbles, slightly acid.	4-50" light yellowish brown loam to pale brown gravelly sandy clay loam, weak to moderate fine subangular blocky structure, 10-30% gravel, medium to strongly acid.
Substratum	46-50" reddish yellow extremely cobbly clay loam, strong medium subangular blocky structure, 65% gravel and cobbles, slightly acid.	50-68" highly fractured slightly to moderately weathered metasediments.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-4	3-4
Adapted Species Group	DF, PP, SP	DF, PP, SP
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	6.0-9.7	4.0-7.5
AWC for Surface 24"	2.0-5.0	2.4-4.1
Seedling Survival Potential	Moderate-High	Moderate-High
Plantability Potential	High	High
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	High	High
Inclusions (10%)	Holland family Marpa family, deep Neuns family Neuns family, deep	

Remarks:

123 Holland, deep-Marpa families complex, 20 to 40 percent slopes

Map Unit Components	Holland family, deep (50%)	Marpa family (30%)
Geomorphic Position	Moderately steep toe slopes and broken slopes.	Moderately steep broken mountain sideslopes.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest, Mixed Conifer Black Oak Forest	Douglas-fir-Pine Mixed Conifer Forest, Mixed Conifer Black Oak Forest

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, strong medium granular structure, 20% gravel and cobbles, neutral.	0-13" brown heavy loam and gravelly light clay loam, moderate and weak medium granular structure, 5-35% gravel, slightly acid.
Subsoil	3-46" light brown to reddish yellow gravelly clay loam and cobbly clay loam, moderate medium and coarse subangular blocky structure 15 to 20% gravel and cobbles, slightly acid.	13-26" light brown very gravelly clay loam, massive, 40-50% gravel, strongly acid.
Substratum	46-50" reddish yellow extremely cobbly clay loam, strong medium subangular blocky structure, 65% gravel and cobbles, slightly acid.	26-32" fractured shale.

Soil Properties & Management Interpretations

Forest Survey Site Class	3-4	5
Adapted Species Group	DF, PP, SP	DF, PP, SP
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	6.0-9.7	2.0-4.5
AWC for Surface 24"	2.0-5.0	1.6-3.3
Seedling Survival Potential	Moderate-High	Moderate-High
Plantability Potential	High	High
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	High	Moderate
Inclusions (20%)	Holland family Marpa family, deep Hugo family	

Remarks:

124 Holland, deep-Marpa families complex, 40 to 60 percent slopes

Map Unit Components	Holland family, deep (50%)	Marpa family (30%)
Geomorphic Position	Steep, dissected mountain sideslopes.	Steep, dissected mountain sideslopes.
Typical Vegetation Series	Douglas-fir-Pine Mixed Conifer Forest, Mixed Conifer Black Oak Forest	Douglas-fir-Pine Mixed Conifer Forest, Mixed Conifer Black Oak Forest

Soil Profile Description

Surface Soil	0-3" brown gravelly loam, strong medium granular structure, 20% gravel and cobbles, neutral.	0-13" brown heavy loam and gravelly light clay loam, moderate and weak medium granular structure, 5-35% gravel, slightly acid.
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Soil Properties & Management Interpretations

Forest Survey Site Class	3-4	5
Adapted Species Group	DF, PP, SP	DF, PP, SP
Soil Erodibility	Moderate	Moderate
AWC for Profile Depth	6.0-9.7	2.0-4.5
AWC for Surface 24"	2.0-5.0	1.6-3.3
Seedling Survival Potential	High	Moderate-High
Plantability Potential	High	High
Hydrologic Soil Group	B	B
Potential for Roadbed Damage	High	Moderate
Inclusions (20%)	Holland family Marpa family, deep Hugo family	

Remarks:

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